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SITE INSPECTION REPORT SITE 21 BUILDINGS 1517/1506 AREA VOLUME I OF II NS GREAT LAKES IL
2/1/2011
TETRA TECH

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Site Inspection Report
for the
Site 21 – Buildings 1517/1506 Area

Volume I of II

Naval Station Great Lakes
Great Lakes, Illinois

NAVFAC
Naval Facilities Engineering Command
Midwest

Naval Facilities Engineering Command Midwest

Contract Number N62472-03-D-0057

Contract Task Order C064

February 2011

SITE INSPECTION REPORT
FOR
SITE 21 – BUILDINGS 1517/1506 AREA

NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command
Midwest
201 Decatur Ave., Building 1A
Great Lakes, IL 60088

Submitted by:
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CONTRACT NUMBER N62472-03-0057
CONTRACT TASK ORDER C064

FEBRUARY 2011

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ACRONYMS

ALM	Adult Lead Methodology
ATSDR	Agency for Toxic Substances and Disease Registry
BAP	benzo(a)pyrene
BAP Eq	benzo(a)pyrene equivalent
BEHP	bis(2-ehtylhexyl)phthalate
bgs	below ground surface
CLEAN	Comprehensive Long-Term Environmental Action Navy
CNS	Central Nervous System
COC	Chemical of concern
COPC	Contaminant of Potential Concern
c-PAH	Carcinogenic PAH
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
CTE	Central Tendency Exposure
CTO	Contract Task Order
CVS	Cardiovascular system
DGPS	Differential global positioning system
DO	Dissolved oxygen
DPT	Direct push technology
EM	Electromagnetic
EPC	Exposure Point Concentration
EU	Exposure Unit
GPR	Ground penetrating radar
GPS	Global positioning system
GROs	Groundwater Remediation Objectives
HEAST	Health Effects Assessment Summary Tables
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
HSA	Hollow Stem Auger
IAC	Illinois Administrative Code
ID	Inside diameter
IDW	Investigation-derived waste
IEPA	Illinois Environmental Protection Agency
IEUBK	Integrated Exposure Uptake Biokinetic Model for Lead in Children

ILCR	Incremental Lifetime Cancer Risk
IP	In-phase
IRIS	Integrated Risk Information System
IRP	Installation Restoration Program
JULIE	Joint Utility Locating Information for Excavators
LUST	Leaking Underground Storage Tank
MCL	Maximum contaminant level
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NAD	North American Datum
NAVD	North American Vertical Datum
NAVFAC MW	Naval Facilities Engineering Command Midwest
NCEA	National Center for Environmental Assessment
NS	Naval Station
OPPTS	Office of Prevention, Pesticides, and Toxic Substances
ORNL	Oak Ridge National Laboratory
ORP	Oxidation reduction potential
OSWER	Office of Solid Waste and Emergency Response
PAH	Polynuclear aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PEF	Particulate emissions factor
PID	Photoionization detector
PPE	Personal protective equipment
PPRTVs	Provisional Peer Reviewed Toxicity Values
ppt	parts per thousand
psi	pounds per square inch
PVC	Polyvinyl chloride
QA	Quality Assurance
QC	Quality Control
QP	Quadrature-phase
RAIS	Risk Assessment Information System
RBC	Risk-Based Concentration
RfC	Reference Concentration
RfD	Reference Dose
RME	Reasonable Maximum Exposure
RSL	Residential Screening Level
SI	Site Inspection
SOP	Standard Operating Procedure

SROs	Soil Remediation Objectives
SSL	Soil Screening Level
SVOC	Semivolatile organic compound
TACO	Tiered Approach to Corrective Action Objectives
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic equivalent
UCL	Upper Confidence Limit
UFP-SAP	Uniform Federal Policy – Sampling and Analysis Plan
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
VDEQ	Virginia Department of Environmental Quality
VOC	Volatile organic compound
XRF	X-Ray Fluorescence

EXECUTIVE SUMMARY

E.1 PURPOSE AND OBJECTIVE OF REPORT

This Site Inspection (SI) Report summarizes the field investigative activities and data, and the results of the geophysical survey and analytical activities for Site 21, Building 1517 Landfill, located within Naval Station Great Lakes (NS Great Lakes) in Great Lakes, Illinois The chemical data for Site 21 (groundwater and soil) were used to conduct a Human Health Risk Assessment (HHRA).

The SI was completed in two phases. A geophysical survey was completed prior to Phase I of the SI in an attempt to determine the edges of suspected disposal areas related to the former ravines; this information was used to guide the subsequent media sampling efforts. Phase I of the SI fieldwork was conducted in September 2009 and consisted of the drilling of soil borings, and the collection and laboratory analysis of soil samples. Phase II of the SI fieldwork was conducted in November 2009 and consisted of the installation of permanent groundwater monitoring wells, collection and laboratory analysis of groundwater samples, and surveying of the groundwater monitoring wells.

Site 21 has contractually been identified as "Site 21 – Building 1517 Landfill." This identification of the site as a landfill was based on the presumption that drainage ravines were historically filled with soil and waste in the process of developing the site for use, similar to what occurred on the adjacent Site 9. However, investigation of the site has showed no evidence of landfilling. Therefore, in order to eliminate the misconception that waste has been placed at the site, its name will be changed to remove the term "landfill" and to more appropriately describe the project area. For the purpose of this report, Site 21 will be identified as "Site 21 – Buildings 1517/1506 Area."

E.2 INVESTIGATION OBJECTIVES

Data collected during the SI were used to meet the following objectives:

- Determine the nature of fill material(s) that were used at Site 21, and identify human health risks that may be associated with this material.

- Determine if concentrations of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), inorganics, pesticides/herbicides, polychlorinated biphenyls (PCBs), and dioxins/furans are present within soil and groundwater at Site 21, and if they exceed regulatory screening levels.

- Prepare a SI Report for submittal to the Illinois Environmental Protection Agency (Illinois EPA).

E.3 HISTORICAL INFORMATION

Site 21 is located in the northern portion of Naval Station Great Lakes, and is approximately 7 acres. Site 21 contains several buildings and parking lots, and is almost entirely covered with buildings and pavement. Building 1517, located on Site 21, is used for equipment storage, and was historically associated with the salvage operations at Naval Station Great Lakes. A storage building is located south of Building 1517 and is used by the paint, electrical, etc. shops. A temporary hazardous waste storage area is also located next to Building 1517 at the southwest corner. Building 1506, which sits in the northwestern portion of Site 21, was built in 1993, and houses offices along with the garage and fueling station for base support and government vehicles.

As a result of the historical practices at Naval Station Great Lakes, there may be soil and groundwater contamination at Site 21. The area north of Building 1517 may have been used to store waste or scrap material on concrete pads next to rail spurs from the 1930s to 1940s. These materials may have been hauled away by railcar, or the waste materials may have been sent to an incinerator, which was located in the northwest portion of the site until 1964. Prior to 1950 until the 1960s or 1970s, the site was used as a coal stockpile area, which covered most of Site 21 north of Building 1517. Two nearby sites may have affected Site 21: the underground-storage tank (UST) Site 5, northwest of Site 21, where Leaking Underground Storage Tanks (LUSTs) were present that were likely used for oil or fuel storage; and Site 5, the Transformer Storage Boneyard, south of Site 21, that was the primary storage area for out-of-service transformers from 1945 to 1985. Elevated concentrations of PCBs have been detected at Site 5.

Prior to this SI, no environmental sampling involving chemical data analysis had been conducted to specifically define environmental conditions at Site 21. Monitoring wells and soil borings were installed in the westernmost corner of the Site as part of an investigation of leaking storage tanks on an adjacent point of entry. Other types of subsurface investigations have provided information about the site. Soil borings drilled prior to the construction of Building 1506 over a large portion of the northern and western sections of Site 21 indicated the presence of thin zones of fill in that area of the site; however no buried waste or debris was found. In addition, a geophysical survey performed by Tetra Tech NUS, Inc. (Tetra Tech) prior to this SI indicated that there could potentially be fill or waste and debris in the southeastern corner of the site, but none was encountered in the soil borings.

E.4 SITE-SPECIFIC GEOLOGY

The surface of Site 21 is covered primarily with buildings and pavement, except for the northwestern and southeastern corners where there are grassy areas, and the northeastern corner where there is a soil/gravel-covered area. With the exception of the southwestern portion of the site, most of the site has a layer of fill material below the asphalt/grassy top to a depth of 1 to 5 feet below ground surface (bgs). There was no evidence of waste placement or "landfilling" encountered in the investigation of the site. Typically this fill is a sand, gravelly sand, and/or silty sand with areas of coal, ash, slag, brick fragments, etc. Below this fill material is a natural clay/silt unit that is common in the Great Lakes area, which was observed to 28 feet bgs during this SI.

Laboratory sieve analysis of one sample location at Site 21 and three sample locations at Site 9 (adjacent site) indicates that the Unified Soil Classification System description of the soil encountered during the investigation ranges from SP/SM (sandy silt) near the surface to SM (silty sand), SM/SC (silty, clayey sand), and ML/CL (silt clay mix) in the subsurface soil.

E.5 SITE-SPECIFIC HYDROGEOLOGY

The groundwater level measurements from the six wells installed onsite show that the top of the shallow aquifer ranges from approximately 1.35 to 6.25 feet bgs, and is composed primarily of a silty clay unit. The flow direction of groundwater onsite is typically in the southeast direction. Slug aquifer tests were completed on four wells at Site 21: NTC21-MW-01, NTC21-MW-02, NTC21-MW-05, and NTC21-MW-06. Hydraulic conductivity (K) values calculated for the wells ranged from 1.73 $x10^{-2}$ cm/sec to 8.75 x 10^{-4} cm/sec, and averaged 6.97 x 10^{-3} cm/sec.

E.6 RELATED REMEDIATION AND INVESTIGATION

In April 2010, TolTest, Inc. under subcontract to Naval Facilities Engineering Command (NAVFAC), completed closure of a former UST site located at Naval Station Great Lakes, Building 1600A. Building 1600A is located due west of Building 1506 across Spauling Street and the adjacent railroad tracks. It is approximately 200 feet west of the Site 21 western boundary. As part of the closure, TolTest removed tanks and soil, and installed, operated, and monitored a biosparge system to treat a groundwater plume. The groundwater plume was identified as extending east approximately 250 feet from the source and onto the northwest corner of Site 21. As part of closure activities, groundwater samples were collected from 8 existing monitoring wells in March 2008 and soil samples were collected from 11 locations in December 2008. Two of the well locations (MW-5 and MW-6) and three of the soil sampling locations (SB09, SB10, and SB11) were situated in the northwest portion of Site 21. All of the groundwater samples, including those collected from MW-5 and MW-6 in March 2008, were below the groundwater remediation objectives (GROs). Additionally, all of the soil samples collected met the soil remediation objectives (SROs) while taking into account the background values, with the exception of the sample from SB10.

E.7 SI FIELD ACTIVITIES

A geophysical survey was performed using an electromagnetic (EM) instrument, Geonics EM31-MK2. The objective of the geophysical survey work was to identify areas that may contain buried waste or other subsurface anomalies. This information was then used to guide subsequent media sampling efforts.

Twenty-two test borings were performed at Site 21 using direct push technology (DPT) drilling. Surface soil samples were collected at each of the test boring locations for laboratory analysis. Because most of the site surface is asphalt/pavement, soil samples were collected immediately below the pavement and taken directly from the acetate liner advanced by the DPT. One surface soil sample was collected for laboratory analysis from each DPT soil boring location at a depth of 0.5 to 1.0 foot bgs (the first 6 inches below asphalt).

Subsurface soil samples were collected at each of the 22 test boring locations for laboratory analysis. With the exception of soil borings in the northwest corner where the DPT rig hit shallow refusal, one subsurface soil sample was collected from each DPT soil boring for laboratory analyses. Surface and subsurface soil samples were screened with a photoionization detector (PID) or X-ray Fluorescence (XRF). Samples were collected in locations where staining or odors were observed, or where elevated PID or XRF readings occurred. If there were no elevated readings, and no staining or odors were observed, soil samples were collected from the interval directly above the groundwater table.

Permanent monitoring wells (NTC21-MW-01 through NTC21-MW-06) were installed in six locations at Site 21 to investigate the first water bearing (shallow groundwater) zone. Monitoring wells were installed to allow for the collection of groundwater samples for laboratory analysis to determine the presence of groundwater contamination, and to determine the depth to groundwater. After monitoring wells were installed and sampled, slug tests were conducted to determine groundwater aquifer characteristics.

E.8 SI RESULTS

Surface soil, subsurface soil, and groundwater analytical results were compared to regulatory screening criteria provided by the Illinois Tiered Approach to Corrective Action Objectives (TACO), Illinois Non-TACO, and United States Environmental Protection Agency (USEPA). Analytical results were compared against both the minimum regulatory screening values, which are primarily based on conservative residential exposure scenarios, and the applicable Illinois TACO Residential and Industrial criteria that address only ingestion and inhalation exposure routes. The results of the comparisons against the TACO Ingestion and Inhalation Remediation Objectives for Residential and Industrial recipients for surface soil, subsurface soil and groundwater are summarized below.

Surface Soil Results

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)flouranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, lead, and manganese were detected at concentrations above TACO Ingestion Remediation Objectives (Residential and/or Industrial).

Benzo(a)anthracene was detected at concentrations that exceed TACO Ingestion Residential (900 ug/kg) and/or Industrial (8,000 ug/kg) Remediation Objectives in samples collected from NTC21-SB-01, NTC21-SB-03, NTC21-SB-07, NTC21-SB-11, and NTC21-SB-21.

Benzo(a)pyrene was detected at concentrations that exceed TACO Ingestion Residential (90 ug/kg) and/or Industrial (800 ug/kg) Soil Remediation Objectives in samples collected from NTC21-SB-01 through NTC21-SB-03, NTC21-SB-05, NTC21-SB-07 through NTC21-SB-12, NTC21-SB-14, and NTC21-SB-17 through NTC21-SB-22.

Benzo(b)flouranthene was detected at concentrations that exceed TACO Ingestion Residential (900 ug/kg) and/or Industrial (8,000 ug/kg) Soil Remediation Objectives in samples collected from NTC21-SB-01, NTC21-SB-03, NTC21-SB-07, NTC21-SB-08, NTC21-SB-10, NTC21-SB-11, NTC21-SB-17, and NTC21-SB-21.

Benzo(k)fluoranthene was detected at a concentration of 21,000 ug/kg (estimated) in soil sample NTC21-SB21-SO-0001, located slightly south of Building 1517. This concentration exceeded the TACO Residential Ingestion Soil Remediation Objective value of 9,000 ug/kg.

Dibenzo(a,h)anthracene was detected at concentrations that exceed TACO Ingestion Residential (90 ug/kg) and/or Industrial (800 ug/kg) Soil Remediation Objectives in soil samples collected from NTC21-SB-01, NTC21-SB-03, NTC21-SB-08, NTC21-SB-10, NTC21-SB-11, NTC21-SB-17, and NTC21-SB-21.

Lead was detected at concentrations that exceed TACO Residential Ingestion (400 mg/kg) Soil Remediation Objectives in samples collected from NTC21-SB-10 and NTC21-SB-13.

Manganese was detected at a concentration of 2,420 J mg/kg in soil sample NTC21SB-14, located directly north of Building 1517. This concentration exceeded the TACO Residential Ingestion Soil Remediation Objective value of 1,600 mg/kg.

Subsurface Soil Results

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)flouranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and manganese were detected at concentrations above TACO Ingestion Remediation Objectives (Residential and/or Industrial).

Benzo(a)anthracene was detected at concentrations that exceed TACO Ingestion Residential (900 ug/kg) and/or Industrial (8,000 ug/kg) Soil Remediation Objectives in samples collected from NTC21-SB-02, NTC21-SB-03, and NTC21-SB-07.

Benzo(a)pyrene was detected at concentrations that exceed TACO Ingestion Residential (90 ug/kg) and/or Industrial (800 ug/kg) Soil Remediation Objectives in samples collected from NTC21-SB-02, NTC21-SB-03, NTC21-SB-05 through NTC21-SB-09, NTC21-SB-11, NTC21-SB-12, and NTC21-SB-22.

Benzo(b)flouranthene was detected at concentrations that exceed TACO Ingestion Residential (900 ug/kg) and/or Industrial (8,000 ug/kg) Soil Remediation Objectives in samples collected from NTC21-SB-02, NTC21-SB-03, NTC21-SB-07, NTC21-SB-08, and NTC21-SB-12.

Benzo(k)fluoranthene was detected at a concentration of 14,000 ug/kg in soil sample NTC21-SB-03, located in the northwest corner of the site, which is the former location of the incinerator. This concentration exceeded the TACO Residential Ingestion Soil Remediation Objective value of 9,000 ug/kg.

Dibenzo(a,h)anthracene was detected at concentrations that exceed TACO Ingestion Residential (90 ug/kg) and/or Industrial (800 ug/kg) Soil Remediation Objectives in samples collected from NTC21-SB-02, NTC21-SB-03, NTC21-SB-08, and NTC21-SB-12.

Indeno(1,2,3-cd)pyrene was detected at concentrations that exceed TACO Ingestion Residential (900 ug/kg) and/or Industrial (8,000 ug/kg) Soil Remediation Objectives in samples collected from NTC21-SB-03 and NTC21-SB-07.

Manganese was detected at a concentration of 1,690 mg/kg in soil sample NTC21-SB-09-SO-0204, located southeast of Building 1517. This concentration exceeded the TACO Residential Ingestion Soil Remediation Objective value of 1,600 mg/kg.

Groundwater Results

Pentachlorophenol, iron, and manganese were detected at concentrations above TACO Class I Groundwater criteria.

Pentachlorophenol was detected in one sample collected from NTC21-MW-01 at a concentration [7.8 (estimated) ug/L] exceeding TACO Class I Groundwater criteria (1.0 ug/L). Monitoring well NTC21-MW-01 is located in the northwest corner of the site, which is the former location of the incinerator.

Iron was detected in one sample collected from NTC21-MW-02 at a concentration (34,000 ug/L) exceeding TACO Class I Groundwater criteria (5,000 ug/L). Monitoring well NTC21-MW-02 is located north of Building 7801.

Manganese was detected at concentrations that exceed TACO Class I Groundwater criteria (150 ug/L) in groundwater samples collected from NTC21-MW-02 through NTC21-MW-05.

E.9 HUMAN HEALTH RISK ASSESSMENT

A baseline HHRA was performed to characterize and quantify potential health risks at Site 21. The objective of the HHRA was to determine whether detected concentrations of chemicals within the study area pose a significant threat to potential human receptors under current and/or future land use. The HHRA for Site 21 is based on chemical data for surface soil, subsurface soil, and groundwater obtained from the SI. The potential risks to human receptors are estimated based on the assumption that no actions will be taken to control contaminant releases.

Based on the non-cancer and cancer evaluations, the following contaminants with non-cancer hazard quotients (HQs) greater than 1.0 or with cancer risks greater than $1x10^{-4}$ were identified as chemicals of concern (COCs):

- c-Polynuclear aromatic hydrocarbons (PAHs), arsenic, and iron for residential exposure to surface soil.
- Arsenic, iron, cobalt, and c-PAHs for residential exposure to subsurface soil.
- Inhalation of manganese in subsurface and surface soil by construction workers.

If the domestic use of groundwater is taken into consideration, based on the non-cancer and cancer evaluations, the following contaminants with non-cancer HQs greater than 1.0 or with cancer risks greater than $1x10^{-4}$ were identified as COCs: arsenic, cobalt, iron, manganese, pentachlorophenol, and dioxins for residential exposure to groundwater. However, direct exposure to groundwater at Site 21 is not expected to occur under current and/or future land uses because the facility and the area surrounding the facility are supplied by public water, the facility has a groundwater use restriction in place, and there are no drinking water wells located downgradient of the site.

When the maximum concentrations of the inorganic compounds detected at Site 21 in surface soil were compared to background data established for use by the Illinois EPA, no inorganics were found to be below background, based on maximum concentrations. However, if the overall averages of detected inorganics were compared to the background data set, aluminum, antimony, arsenic, barium, cobalt, iron, manganese, and vanadium were below the background values. This indicates that it is possible that these inorganic compounds at Site 21 could be background constituents.

Carcinogenic risks were calculated using the highest concentrations of c-PAHs encountered at the site. These occurred for subsurface and surface soil at sampling locations NTC21-SB-03 and SB-21, respectively. Concentrations of c-PAHs at these two locations were relatively high compared to the results obtained from all of the other sampling location across Site 21. Therefore, theoretical excess lifetime cancer risks are likely overestimated given the application of the maximum detected soil concentration of benzo(a)pyrene (BaP) equivalents as the exposure point concentration (EPC). Inclusion of such high outlier maximum concentrations also will yield the calculation of relatively high mean and 95 percent upper confidence limit (UCL) of the mean concentrations, potentially resulting in an overestimation of risks for scenarios that use statistical values as EPCs.

E.10 RECOMMENDATIONS

Soil

Recommendations for soil will be provided in final document.

Groundwater

Recommendations for groundwater will be provided in final document.

1.0 INTRODUCTION AND PURPOSE

Tetra Tech NUS, Inc. (Tetra Tech) was contracted by the Department of the Navy, Naval Facilities Engineering Command Midwest (NAVFAC MW) to perform a Site Inspection (SI), and associated reporting for Site 21, located within Naval Station Great Lakes (NS Great Lakes) in Great Lakes, Illinois. Figures 1-1 and 1-2 show the general location of Naval Station Great Lakes and the location of Site 21. This work was performed under Contract Task Order (CTO) No. C064 under the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract No. N62472-03-0057. This SI report presents the results of investigative, sampling, and analytical activities conducted in accordance with the Uniform Federal Policy – Sampling and Analysis Plan (UFP-SAP) (Tetra Tech, 2009).

Site 21 has contractually been identified as "Site 21 – Building 1517 Landfill." This identification of the site as a landfill was based on the presumption that drainage ravines were historically filled with soil and waste in the process of developing the site for use, similar to what occurred on the adjacent Site 9. However, investigation of the site has showed no evidence of landfilling. Therefore, in order to eliminate the misconception that waste has been placed at this site, its name will be changed to remove the term "landfill" and to more appropriately describe the project area. For the purpose of this report, Site 21 will be identified as "Site 21 – Buildings 1517/1506 Area."

1.1 PROJECT OVERVIEW

A SI was conducted to determine the presence or absence of contaminated soil and groundwater, and to determine through a screening analysis whether any chemical concentrations found to be present are greater than acceptable risk-based human health screening levels. The SI was completed in two phases. Initially, a geophysical survey was completed in September 2008 to determine the edges of the suspected disposal area; this information was then used to guide the subsequent subsurface investigation and media sampling efforts. Phase I of the SI occurred in September 2009 and consisted of the drilling of soil borings, and collection and laboratory analysis of soil samples. Phase II of the SI took place in November 2009 and consisted of the installation of permanent groundwater monitoring wells, collection and laboratory analysis of groundwater samples, and land surveying of sample locations. The results from the geophysical survey and soil and groundwater investigation are provided in this report.

1.2 INVESTIGATION OBJECTIVES

Data collected during the SI were used to meet the following objectives:

- Determine the nature of fill material(s) that were used at Site 21, and identify human health risks that may be associated with this material.

- Determine if concentrations of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), inorganics, pesticides/herbicides, polychlorinated biphenyls (PCBs), and dioxins/furans are present within soil and groundwater at Site 21, and if they exceed regulatory screening levels.

- Prepare a SI Report for submittal to the Illinois Environmental Protection Agency (Illinois EPA).

1.3 REPORT ORGANIZATION

The purpose of this SI report is to present the results of the SI activities that Tetra Tech conducted at Site 21 in September 2008 and September and November 2009.

Section 1.0 presents the purpose of this report. Section 2.0 summarizes background information and physical characteristics for Site 21. Section 3.0 presents the SI activities performed at Site 21. Section 4.0 presents the SI results. Section 5.0 presents the Human Health Risk Assessment. Section 6.0 presents the conclusions and recommendations. Appendices that support this report include the following:

- Appendix A – Historical Drawings and Photographs
- Appendix B – Field Forms
- Appendix C – Waste Profiles
- Appendix D – Data Validation Reports
- Appendix E – Survey Report
- Appendix F – Analytical Results
- Appendix G – Human Health Risk Assessment Supporting Data

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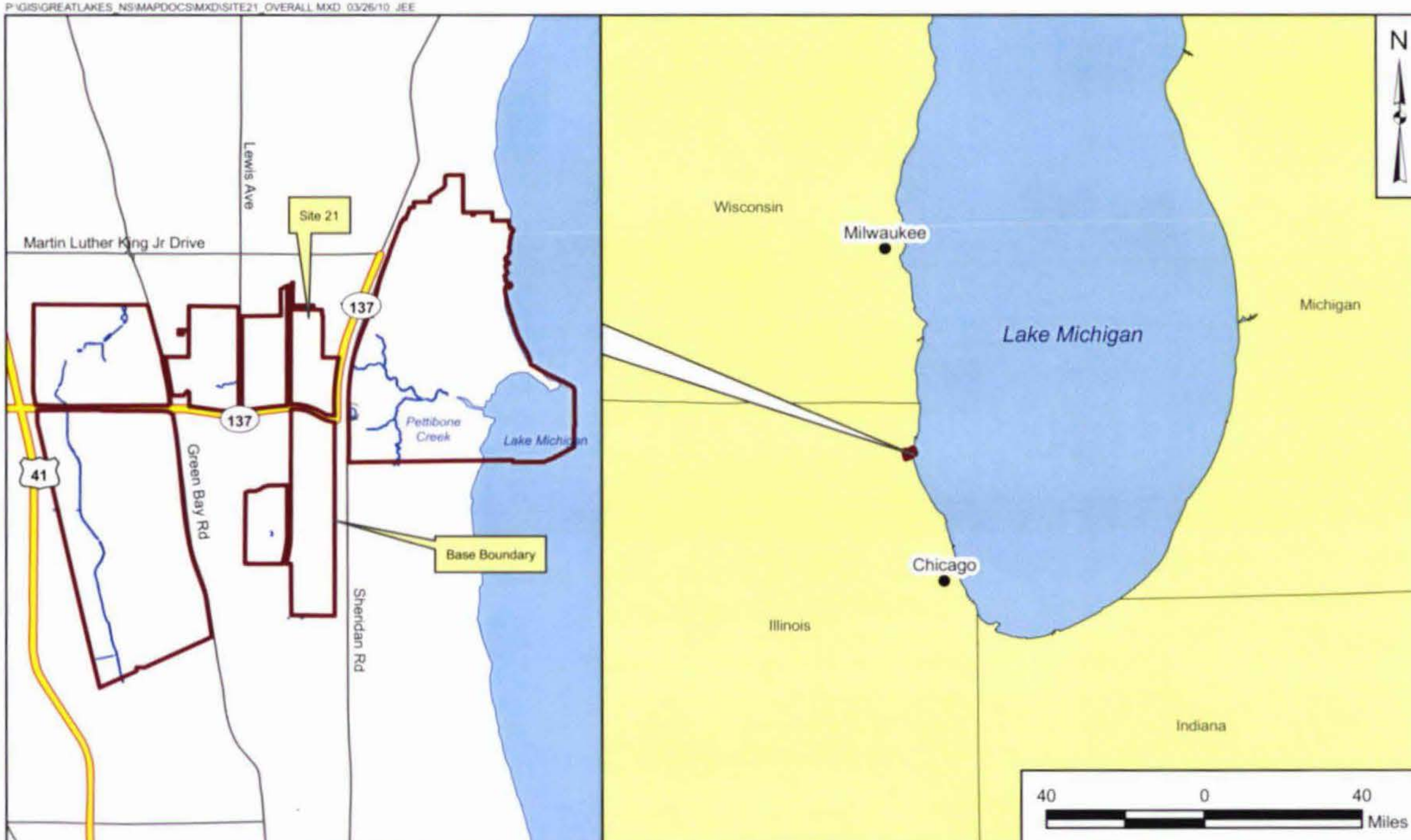

DRAWN BY	DATE		CONTRACT NUMBER	
K. MOORE	12/29/08	GENERAL LOCATION MAP	CTO C064	
CHECKED BY	DATE	SITE 21 - BUILDINGS 1517 / 1506 AREA	APPROVED BY	DATE
S. HILL	03/26/10	NAVAL STATION GREAT LAKES	B. CUMMINGS	03/26/10
COST/SCHEDULE AREA		GREAT LAKES, ILLINOIS	APPROVED BY	DATE
			—	—
SCALE			FIGURE NO.	REV
AS NOTED		NAVFAC	FIGURE 1-1	0

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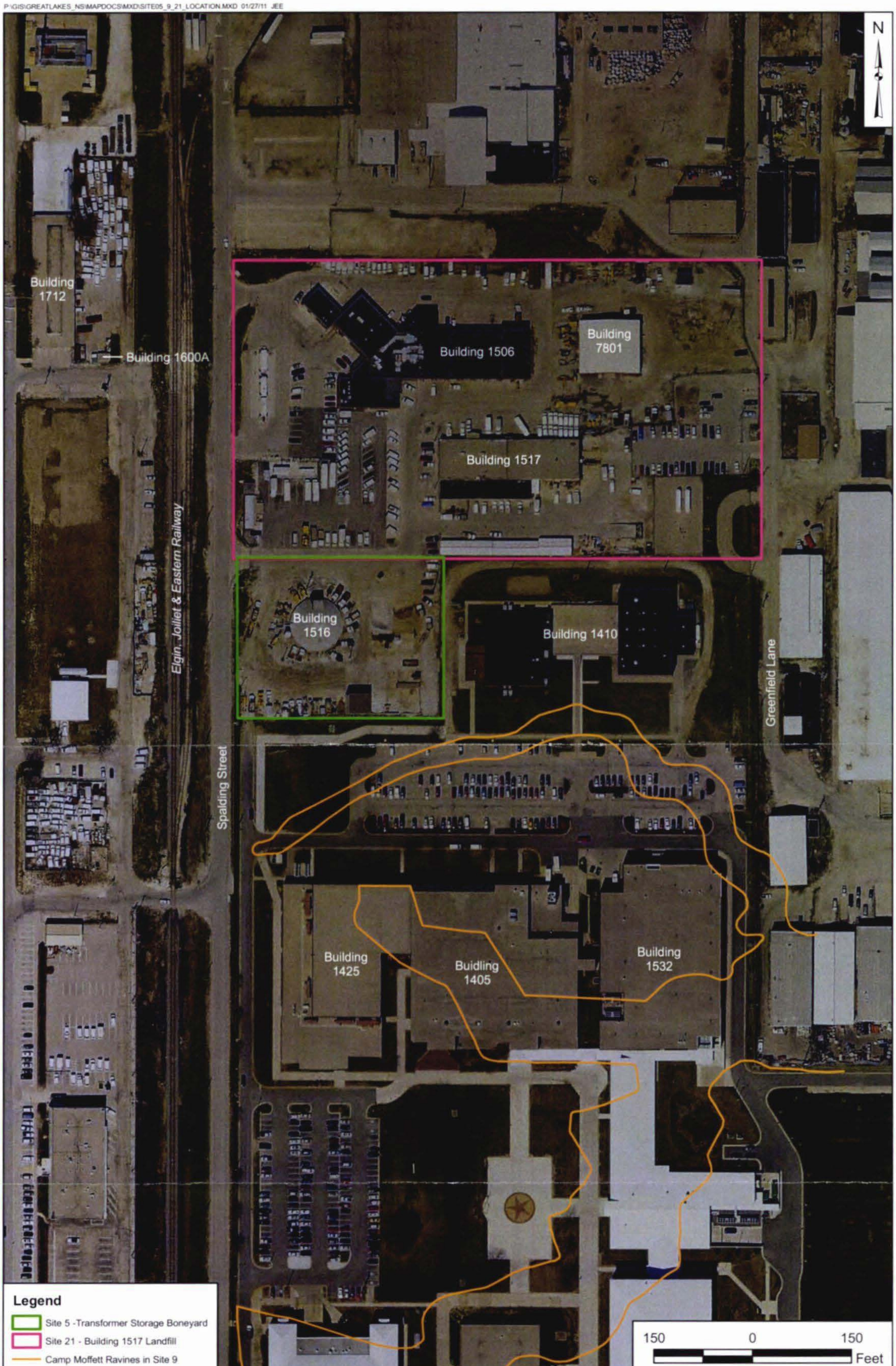

DRAWN BY K. MOORE	DATE 02/17/09	NAVFAC	SITE VICINITY MAP SITE 21, SITE 9, AND SITE 5 NAVAL STATION GREAT LAKES GREAT LAKES, ILLINOIS	CONTRACT NUMBER CTO 510
CHECKED BY N. ROCHNA	DATE 01/27/11			APPROVED BY RFD — DATE 11/23/10
COST/SCHED AREA				APPROVED BY — DATE
SCALE AS NOTED				FIGURE NO. FIGURE 1-2 — REV 0

2.0 PROJECT BACKGROUND AND PHYSICAL SETTING

The following sections provide a brief description of the project background and physical setting along with a summary of previous relevant investigations completed at Site 21. Figures 1-1 and 1-2 show the general location of Naval Station Great Lakes and the location of Site 21. Figure 2-1 shows the layout of Site 21.

2.1 FACILITY LOCATION AND DESCRIPTION

Naval Station Great Lakes is located in Lake County, Illinois, along the shore of Lake Michigan. It is bounded on the north by the City of North Chicago, on the south by the Veterans Administration Hospital and Shore Acres Golf Course and Country Club, on the east by Lake Michigan, and on the west by U.S. Route 41 (Skokie Highway).

2.2 FACILITY ENVIRONMENTAL SETTING

Naval Station Great Lakes covers 1,202 acres of Lake County, Illinois. Lake County is located in northeastern Illinois, north of the City of Chicago, and comprises 24 miles of Lake Michigan shoreline. Lake County extends from the Wisconsin border south to Cook County, and from Lake Michigan west to McHenry County. Lake County is divided into 18 townships, 52 incorporated cities and villages, and 18 unincorporated cities and villages.

There are numerous lakeside communities in Lake County. The most recent 2000 United States Census Bureau data estimate the county's population at 617,975. During the 1950s and 1960s, population growth occurred primarily in the lakefront communities; but, by the 1980s and 1990s, population growth occurred north and west. Currently, most of Lake County's population lives in the 52 incorporated cities and villages.

Current land uses in Lake County include agricultural, industrial, and residential. Farmland and lake resorts characterize the western portions of the county; and industrial, urban, and suburban areas are situated along the 24 miles of Lake Michigan shoreline to the east. There are also three state parks in Lake County.

Naval Station Great Lakes administers base operations and provides facilities and related support to training activities (including the Navy's only boot camp) and a variety of other military commands located on base. The land surrounding Naval Station Great Lakes currently has a variety of uses. Along the northern boundary of the base are the most highly urbanized and industrial areas. Much of the land beyond the northwestern site boundary comprises unincorporated lands of Lake County, and is vacant except for scattered retail and residential properties. Adjacent to the western boundary are primarily industrial properties, and along the southern boundary is a mixture of public open space and residential land (Tetra Tech, 2007).

2.2.1 Physiography and Topography

The gently rolling topography of Lake County, Illinois, is the result of glaciation. The most prominent topographic features are glacial moraines and other unconsolidated glacial deposits that cover most of Naval Station Great Lakes. The terrain of Naval Station Great Lakes consists of relatively flat glacial drift deposits bordered by steep lake-facing bluffs cut with vertical sloping ravines. The unconsolidated glacial material that comprises the bluff faces and ravine walls is under continual erosion.

The topography of Lake County creates poorly defined drainage patterns consisting of swales that enter depressions and marshes. Most of Naval Station Great Lakes is located on a plateau with elevations of 640 to 660 feet above mean sea level. Pettibone Creek, the eastern portion of Naval Station Great Lakes, and the Lake Michigan shoreline are at an elevation of approximately 600 feet above sea level.

Intensive development has replaced most of the oak, hickory, maple, and other hardwood forests that originally covered the area. Native woodlands occur primarily on the vertical sloped ravine of Pettibone Creek and on the bluffs facing Lake Michigan. The forested areas of Naval Station Great Lakes are vegetated with white and red oak, maple, European larch, white and Scotch pine trees, and shrubs including raspberry and blackberry bushes. The principal mammals in the Naval Station Great Lakes area include: groundhogs, raccoons, squirrels, opossum, rabbits, chipmunks, and deer (Tetra Tech, 2003).

2.2.2 Climate

The climate of Lake County, Illinois, is considered continental. Changes in temperature, humidity, cloudiness, and wind direction occur frequently. The summer season is warm with few prolonged hot periods. Although major droughts are infrequent, there are commonly long periods of dry weather during the growing season. The area receives approximately 34 inches of rain per year, with 63 percent occurring between April and September. The average seasonal snowfall range is 37.2 to 41.1 inches. The average temperature is 58 degrees Fahrenheit; the winter months normally have temperatures below freezing.

2.2.3 Soil

The soil of Lake County, Illinois, is classified into two groups: Morley-Beecher-Hennepin and Made Land soil. Morley-Beecher-Hennepin soil consists primarily of loams and silt loams and is located on level to very steep ravines. This soil is characterized as well- to poorly-drained, and has low to moderate permeability. Made Land soil includes areas of manmade cuts and fills covered by roads and buildings. This fill material includes a variety of soil and non-soil materials that have not been characterized. The soil types that form the plateau where Naval Station Great Lakes is located include: Morley, Aptakisic, Wauconda, Beecher, and silt loams (Tetra Tech, 2007).

2.2.4 Regional Geology

The geologic units encountered at Naval Station Great Lakes include aeolian and lacustrine deposits, and unconsolidated glacial till overlying bedrock. The aeolian material, the Richland Loess, covers the Wadsworth and Equality Formations and ranges from 16 to 20 inches in thickness. This aeolian material is much finer grained than the underlying Formation. These wind-blown materials of the Richland Loess make up the current soil profile of Naval Station Great Lakes.

Unconsolidated glacial tills blanket Lake County. Several glacial moraine systems are present within the county including the Valparaiso, Tinley, Zion City, and Lake Border systems. Naval Station Great Lakes falls within the Lake Border moraine system. The glacial moraine system is composed of the Wadsworth Formation, which constitutes the largest volume of surficial deposits overlying the bedrock and forms the Highland Park Moraine that generally runs parallel to the Lake Michigan shoreline. The Wadsworth Formation ranges from approximately 170 to 210 feet in thickness overlying the Silurian bedrock. This Formation is characterized as a till and is an unsorted mixture of sand, silt, and clay imbedded with pebbles, cobbles, and boulders. Interstices between the coarser-grained sediments are typically filled with fine, clay-sized particles resulting in low permeability. Generally, the Wadsworth till is clayey, with thin and irregular lenses of sand or silty sand occurring over limited areas. The till has been further subdivided into clayey and sandy phases according to the size of the dominant particles. Because clay comprises up to 70 percent of the till at Naval Station Great Lakes, the clayey phase dominates in the local area.

The Wadsworth Formation east of the Highland Park Moraine is generally covered by the Equality Formation, which includes deposits of silt, clay, and sand. Sediments of this formation were deposited in water trapped between the Highland Park Moraine and the former ice sheet.

Bedrock consists of Silurian Niagran and Alexandrian dolomite, the lowermost geologic unit encountered at Naval Station Great Lakes. The bedding is nearly horizontal to gently eastward, dipping in the vicinity of Naval Station Great Lakes. These Silurian units thicken from west to east in Lake County. The interface between the bedrock surface and overlying till consists of 1 to 15 feet of broken bedrock (dolomite), gravel, sand, and coarser material. This material appears to be bedrock debris ground from the advancing glaciers of the Wisconsin Stage of glaciation during the Late Pleistocene epoch (Tetra Tech, 2007).

2.2.5 Regional Hydrology

Naval Station Great Lakes is located within both the North Branch Chicago River Drainage Basin and Lake Michigan North Drainage Basin. The divide between the basins is along Green Bay Road, which runs north to south through the center of the base. Overland flow from precipitation that does not infiltrate into the ground flows into the Skokie River (located south of Naval Station Great Lakes) or Pettibone Creek. The areas east of Green Bay Road drain into Lake Michigan through Pettibone Creek, and areas west of Green Bay Road drain into the Skokie River. Site 21 is located in the Pettibone Creek watershed.

Pettibone Creek is a small creek consisting of the North and South Branches, each with a minor tributary branch that flows through Naval Station Great Lakes and into Lake Michigan. Pettibone Creek flows through well-defined ravines within Naval Station Great Lakes, and is characterized by moderately steep stream bed gradients and banks with 30 to 60 percent slopes. The Pettibone Creek watershed, one of five Lake Michigan watersheds in Lake County, Illinois, drains an area of 4.2 square miles. The hydrology of the watershed is well established.

There is very little floodplain area along Pettibone Creek because of the steeply sloped creek banks. During precipitation events, runoff from overhead bridges and nearby streets adds to the volume of Pettibone Creek. The North Branch of the creek has a short time of concentration (T_C), or time it takes for a unit of water to run the watercourse. The T_C is short because the water source is primarily from an urban area that has low infiltration rates and fast runoff rates during storms. As a result, Pettibone Creek is susceptible to flash floods characterized by high channel velocities and great erosive potential.

The North Branch of Pettibone Creek, which ranges between 15 to 30 feet wide and several inches to 2 feet deep, is a perennial stream that originates from three storm sewers at 22nd Street, runs southeast from the North Chicago area, and merges with the South Branch of Pettibone Creek. The North Branch, on Naval Station Great Lakes property, measures approximately 3,600 feet long before it discharges to the Boat Basin. An unnamed tributary flows into North Branch approximately 910 feet downstream of the origin of North Branch.

Surface water in Pettibone Creek flows eastward into the Naval Station Great Lakes system, which discharges into Lake Michigan. The Illinois State Water Survey calculated the average flow of Pettibone

Creek as less than 10 cubic feet per second (cfs) or 4,488 gallons per minute. This can greatly increase during periods of precipitation (Tetra Tech, 2003).

2.2.6 Regional Hydrogeology

Naval Station Great Lakes is located within the Great Lakes Basin aquifer system for groundwater storage. There are three major regional aquifer systems within the state of Illinois: the surficial aquifer system which are aquifers of alluvial and glacial origin (found throughout the Great Lakes Basin); the Silurian-Devonian aquifers (found in Wisconsin, Michigan, Illinois, Indiana, and Ohio); and the Cambrian-Ordovician (found in Wisconsin, Illinois, and Indiana). The surficial aquifer system consists of unconsolidated glacial and alluvial deposits (mostly silt and pebbly clay) approximately 135 to 155 feet thick that overlie the limestone bedrock throughout much of the Great Lakes Basin. Unlike the surficial aquifer, the Silurian-Devonian and Cambrian-Ordovician aquifers are capable of yielding substantial quantities of water [United States Geological Survey (USGS), 2006].

The silt and pebbly clay in the surficial aquifer has insufficient permeability to allow free groundwater movement. Water-bearing sand stringers do exist in this aquifer; however, these deposits, which would characteristically be capable of transporting groundwater, are neither abundant nor extensive enough to be considered favorable sources of groundwater (Illinois State Geological Survey, 1950).

2.3 SITE HISTORY

Site 21 is located in the northern portion of Naval Station Great Lakes, and is approximately 7 acres. Site 21 contains several buildings and parking lots, and is almost entirely covered with buildings and pavement. Building 1517, located on Site 21, is used for equipment storage, and was historically associated with the salvage operations at Naval Station Great Lakes. A storage building is located south of Building 1517 and is used by the paint, electrical, etc. shops. A temporary hazardous waste storage area is also located next to Building 1517 at the southwest corner. Building 1506, which sits in the northwestern portion of Site 21, was built in 1993, and houses offices along with the garage and fueling station for base support and government vehicles.

As a result of the historical practices at Naval Station Great Lakes, there may be soil and groundwater contamination at Site 21. The area north of Building 1517 may have been used to store waste or scrap material on concrete pads next to rail spurs from the 1930s to 1940s. These materials may have been hauled away by railcar, or the waste materials may have been sent to an incinerator, which was located in the northwest portion of the site until 1964. Prior to 1950 until the 1960s or 1970s, the site was used as a coal stockpile area, which covered most of Site 21 north of Building 1517. Two nearby sites may also have affected Site 21: the underground-storage tank (UST) at Building 1600A, northwest of Site 21, where Leaking Underground Storage Tanks (LUSTs) were present that were likely used for oil or fuel storage; and Site 5, the Transformer Storage Boneyard, south of Site 21, that was the primary storage area for out-of-service transformers from 1945 to 1985. Elevated levels of PCBs have been detected at Site 5. Historical drawings and photographs of Site 21 are included in Appendix A.

Prior to this SI, no environmental sampling involving chemical data analysis had been conducted to specifically define environmental conditions at Site 21. As discussed in Section 2.4, monitoring wells and soil borings were installed in the northwestern corner of site as part of an investigation of leaking storage tanks on an adjacent point of entry. Other types of subsurface investigations have provided geologic information about the site. Soil borings drilled prior to the construction of Building 1506 over a large portion of the northern and western sections of Site 21 indicated the presence of thin zones of fill in that area of the site; however, no buried waste or debris was found. In addition, a geophysical survey performed by Tetra Tech prior to the subsurface investigation indicated that there could potentially be fill or waste and debris in the southeastern corner of the site, but none was encountered in the soil borings.

2.4 RELATED REMEDIATION AND INVESTIGATION

In April 2010, TolTest, Inc. under subcontract to NAVFAC, completed closure of a former UST) site located at Naval Station Great Lakes, Building 1600A. Building 1600A is located due west of Building 1506 across Spauling Street and the adjacent railroad tracks (Figure 1-2). It is approximately 200 feet west of the Site 21 western boundary. As part of the closure, TolTest removed tanks and soil, and installed, operated, and monitored a biosparge system to treat a groundwater plume. The groundwater plume was identified as extending east approximately 250 feet from the source and onto the northwest corner of Site 21. As part of closure activities, groundwater samples were collected from 8 existing monitoring wells in March 2008 and soil samples were collected from 11 locations in December 2008. Two of the well locations (MW-5 and MW-6) and three of the soil sampling locations (SB09, SB10, and SB11) were situated in the northwest portion of Site 21 (Figure 2-2). Although these soil borings and wells where located within Site 21, they were installed with the intended purpose of evaluating the Build 1600A release and remediation.

The cleanup objectives for groundwater for Building 1600A were per 35 Illinois Administrative Code (IAC) Part 742, Appendix B, Table E: Tier 1 Groundwater Remediation Objectives (GROs) for the Groundwater Component of the Groundwater Ingestion Route for Class I Groundwater. The cleanup objectives for soil were 35 IAC Part 742 Soil Remediation Objectives (SROs) for Residential Properties where the SROs are the lowest or most conservative values from within all the listed exposure pathways in the Illinois EPA Tiered Approach to Corrective Action Objectives (TACO) regulations, while taking into account the background values as provided in Table H of Appendix A of TACO for Residential Properties.

All of the groundwater samples, including those collected from MW-5 and MW-6 in March 2008, were below the GROs. Additionally, all of the soil samples collected met the SROs while taking into account the background values, with the exception of the sample from SB10. The soil sample from SB10 had five organic compounds that were above the SROs and background values for Residential Properties. Since the only impacted soil sample from the Building 1600A closure evaluation was collected from Site 21, the Navy requested that the sample data be addressed as part of the Site 21 Installation Restoration Program (IRP) investigation. Given the specifics of both these sites, and because the contamination identified at the SB10 boring location was only slightly above the SROs, Illinois EPA agreed with the request. Furthermore, incorporation of the SB10 data into Site 21 would allow for a clean closure of the UST site under the current TACO clean up objectives. However, because of the description of material encountered in SB11 as being as being black with hydrocarbon odors and another notes black fill material, coal, and slag within the boring, the State requested all relevant data, including that from SB11 and SB09, also be considered in the Site 21 evaluation.

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DRAWN BY J. ENGLISH	DATE 04/16/09	NAVFAC	SITE LOCATION MAP SITE 21 - BUILDINGS 1517 / 1506 AREA NAVAL STATION GREAT LAKES GREAT LAKES, ILLINOIS	CONTRACT NUMBER CTO C064
CHECKED BY S. HILL	DATE 03/26/10			APPROVED BY B. CUMMINGS DATE 03/26/09
COST/SCHED AREA				APPROVED BY DATE
SCALE AS NOTED				FIGURE NO. FIGURE 2-1 REV 0

3.0 SITE INSPECTION ACTIVITIES

The following subsections provide a detailed discussion of field activities that were conducted during the course of the SI at Building 1517/1506 Area (Site 21) at Naval Station Great Lakes. Figures 1-1, 1-2, and 2-1 show the general location of Naval Station Great Lakes, the location of Site 21, and the layout of Site 21, respectively.

3.1 GENERAL DESCRIPTION AND INFORMATION

This SI was performed to determine the presence or absence of potentially contaminated soil and groundwater based on historic activities at Site 21. With exceptions as noted in Section 3.2, the work was performed in accordance with the Site 21 UFP-SAP which was prepared by Tetra Tech.

Data collected were used to meet the following objectives:

- Determine the nature of fill material(s) that were used at Site 21, and identify human health risks that may be associated with this material.
- Determine if concentrations of VOCs, SVOCs, inorganics, pesticides/herbicides, PCBs, and dioxins/furans are present within soil and groundwater at Site 21 Landfill, and if they exceed regulatory screening levels.
- Prepare a SI Report for submittal to the Illinois EPA.

A geophysical survey was performed prior to the SI to help determine soil boring locations. The SI consisted of advancing soil borings using Direct Push Technology (DPT), installing monitoring wells, a professional survey, and collecting and analyzing soil and groundwater samples. Laboratory analyses of soil and groundwater samples were obtained to confirm the presence or absence of contamination at Site 21. Table 3-1 describes the sampling rationale.

3.2 DEVIATIONS FROM THE WORK PLAN

There were two minor deviations from the project UFP-SAP (Tetra Tech, 2009) during the SI at Site 21:

- At sample location NTC21-SB-01, the DPT rig could not drill past 4 to 5 feet below ground surface (bgs) because of refusal. It was decided that the subsurface sample at this location would be collected using a Hollow-Stem Auger (HSA) and split spoon sampler during the second phase of work.

- The groundwater monitoring wells were surveyed for horizontal location and vertical elevation by a registered surveyor. However, DPT soil borings were surveyed by global positioning system (GPS) only.

Field task modification request forms documenting these changes are in Appendix B-1.

3.3 GEOPHYSICAL SURVEY

The objective of the geophysical survey work was to identify areas that may contain buried waste. This information was then used to guide subsequent media sampling efforts. The geophysical survey was conducted on September 15, 2008.

3.3.1 Geophysical Survey Equipment

Tetra Tech performed the geophysical survey using a Geonics EM31-MK2. A ground penetrating radar (GPR) survey was also planned and attempted; however, it was aborted after testing the subsurface conditions and determining that the method could only be effective in surveying the top 2 feet bgs.

The Geonics EM31 is a frequency domain electromagnetic (EM) instrument. The EM31 generates a primary EM field, and secondary EM fields are measured as a function of frequency allowing stark differences in terrain conductivity to be differentiated. Two measurement components are typically recorded: quadrature-phase (QP) and in-phase (IP). The QP component, also referred to as apparent electrical conductivity, is sensitive to metal and non-metal components of the ground; and the IP component is predominantly sensitive to metal. The instrument can be operated in horizontal or vertical dipole mode, which nominally takes bulk earth measurements of 9 or 18 feet, respectively. The actual sampling depth depends on the conductivity of the subsurface, and the height of the instrument when taking the measurement. The potential waste could create metallic and non-metallic anomalies depending on the nature of the waste; however, if a relatively large quantity of soil fill is mixed with a small quantity of waste, the EM31 may not be able to detect anomalous values because the instrument measures a bulk response of the soil and its inclusions.

The EM31 was set to acquire data 4 times per second as the operator moved down the survey line, and was operated in the vertical dipole mode (nominal 18-foot bulk measurement mode) with the 13-foot long boom of the instrument oriented parallel to the survey line direction.

GPR is another electromagnetic method where EM pulses are propagated into the ground, and the reflections of this signal from materials with contrasting electrical properties are subsequently detected. The system can be used to detect both metallic and non-metallic items, although non-metallic items and deteriorated metallic items typically generate weaker or no reflections based on their electrical properties, thereby making them harder to detect or not detectable. Conductive media at the surface (such as standing water) and conductive subsurface media (such as clay) attenuate the GPR signal quickly, thereby limiting signal penetration and the effective depth of exploration with the instrument. The GPR system was used to trigger readings by survey wheel after it had been calibrated in the survey area. The GPR was set up with an approximate 8- to 12-foot depth window based on an assumed velocity for the GPR signal traveling through average soils. Actual GPR signal penetration (depth that the GPR signal penetrated the ground surface) was less, and is estimated to have been generally about 2 feet. Items deeper than the GPR signal penetration could not be detected; hence, the survey was discontinued after it was determined that the signal penetration would not be deep enough to accomplish geophysical objectives.

3.3.2 Geophysical Survey Activities

A survey grid (10-foot spaced marks) was established using tape measures in the survey areas (the multicolored areas in Figures 3-1 through 3-3) to serve as a guide for conducting the geophysical survey along 5-foot spaced parallel survey lines in one direction, where accessible. The selected 5-foot survey line spacing for the project provided thorough survey coverage for detecting potential waste areas, as well as for detecting individual targets that were the size of 55-gallon drums or larger.

The EM31 survey was performed with integrated differential global positioning system (DGPS) readings recorded every 1 second in the survey area using a Trimble Ag114 GPS unit. Prior to field acquisition, the equipment was set up according to manufacturer's recommendations. Calibrations, operational checks, and other pertinent survey information were recorded in a field logbook. EM31 data acquired every 0.25 seconds corresponded to measurements spaced about 1-foot apart, given the survey walking pace with the instrument.

3.3.3 Geophysical Survey Results

The EM31 survey data, and the EM31 interpretation are overlain on top of a site aerial photograph in Figure 3-3. Available subsurface utilities information from Navy inventory is also shown on this figure and annotated in the legend. The color contour bars included with each of the color contour maps provide an indication of the amplitude of the displayed color contours. The anomaly response from a particular object is not unique, in that the depth of burial and lateral distance away from the geophysical instrument (off-line distance) will affect the object's response values.

Figures 3-1 and 3-2 show the EM31 QP and IP data in color contour maps, respectively. Figure 3-3 is a comprehensive interpretation of these contour maps displayed overtop of the IP data to sum the geophysical survey results. EM31 data contouring was performed using Geosoft's Oasis montaj software (version 7.0).

Figure 3-1 shows the EM31 QP component data. This component measures response from nearby metal, although less so than the In-Phase component, and also measures the response from apparent electrical conductivity created by non-metallic items (e.g., food waste, soil, and fill). Apparent conductivity background readings appear to range from about 90 to 100 millisiemens per meter (mS/m), corresponding to green to light green color contours. Anomalies are evident in blue and yellow to pink color contours. Areas where the EM31 data were likely to be significantly interfered with by aboveground features are not included in the interpretation as apparent anomalous conductivity areas. Whether subsurface items of interest are present in these areas cannot be determined from the EM31 data. Subsurface anomalies judged to be significant by the QP data also correspond to anomalies in the IP data suggesting metal presence. These anomalies are consolidated and shown superimposed on the IP data on Figure 3-3.

Figure 3-2 shows the EM31 IP component data. This component measures the response from buried and surface metal located near the instrument. The contour map on this figure shows apparent background readings to be the light-green color contours corresponding to values of approximately 6 parts per thousand (ppt). Buried metal concentrations are evident in the blue, and orange to pink color contours. Two areas of possible buried metal that may represent waste areas are outlined from the EM31 IP data south of the building on Figure 3-3 using solid and dashed lines to delineate them. Dashed lines are used where the edge of the anomaly could not be clearly determined based on other interfering anomalies. Other anomalous responses in the IP data can be attributed to aboveground metallic features. Whether subsurface items of interest are present in these areas cannot be determined from the EM31 data. Three linear EM anomalies are interpreted as possible utilities on Figure 3-3, and are shown by dashed lines on the figure. These anomalies where investigated as part of the soil sampling program, however, no remarkable conditions were encountered.

3.4 SOIL SAMPLING

Historic information suggests that this site may have been used as a landfill. Additionally, there were several coal stockpiles, an old rail spur, and an old incinerator previously located on the site; leaky storage tanks and reported PCB contamination at adjacent sites; and areas of anomalies detected by the geophysical survey during the SI. Based on this information, it was determined that surface and subsurface soil samples would be collected at DPT soil boring locations as part of this SI as shown on Figure 3-4. Soil boring logs are presented in Appendix B-2.

Soil samples were collected from September 26 to 29, 2009. One additional subsurface soil sample was collected November 13, 2009. Prior to conducting drilling activities, TTL Associates, a licensed Illinois driller subcontracted and overseen by Tetra Tech, obtained a Dig Permit from Joint Utility Locating Information for Excavators (JULIE) One-Call after identifying the areas where the intrusive activities would occur. DPT drilling was conducted using a hydraulically-powered direct-push machine for lithologic characterization of soils, collection of surface and subsurface soil samples, and to determine the depth to the water table in and around Site 21. Each boring was logged continuously in an Electronic Data Collection Application (eData) by an on-site geologist as the boring was being drilled. eData is web-based software for the comprehensive planning, collection, management, and use of environmental data. Air quality was monitored in and near each borehole using a photoionization detector (PID) during drilling operations.

Both surface and subsurface samples were analyzed in the field using a calibrated X-ray Fluorescence (XRF) detector and a PID. Details of the PID and XRF screening and sampling methodology are discussed in Sections 3.4.1 and 3.4.2, respectively. VOC samples were collected directly from the acetate sleeve immediately after PID screening. The remainder of the sample interval was placed in a labeled plastic Ziplock (or equivalent) bag. Care was taken to not include any foreign matter (i.e., vegetation, rocks, debris) in the soil samples collected. In general, the samples were analyzed "as-is." The samples were manipulated within the baggies to break up any larger soil fragments to produce a relatively homogenous sample. The XRF and PID readings for each sample were recorded on a field log. Each soil sample was then transferred into clean laboratory-supplied sample containers, immediately labeled, and placed on ice in an insulated cooler to await shipment to the laboratory for analytical testing.

The soil samples collected for laboratory analysis were analyzed for Target Compound List (TCL) VOCs, SVOCs, pesticides/herbicides, PCBs, and Target Analyte List (TAL) metals. Samples in which ash/cinder were observed were also analyzed for dioxins/furans. This is because an incinerator was once present in the northwestern corner of the site that could have produced ash and cinder containing dioxins/furans which may have been used as fill on the site. In addition, one grain size sample was collected from the interval directly above groundwater to assist in better understanding the subsurface soil.

Soil Sample Log Sheets are provided in Appendix B-3. The results of the soil sample analysis are presented in Section 4.

3.4.1 PID Screening

A PID was used to screen samples for the presence of VOCs. Upon sample retrieval, each soil core was screened with a PID. Additionally, before the sample was collected, a headspace screening of the sample was collected by sticking the tip of the PID into a small opening at the top of the plastic Ziplock bag (or equivalent) containing the sample The PID was calibrated daily to 100 parts per million isobutylene.

3.4.2 XRF Screening

XRF was used to field screen soil samples. This technique measures the fluorescence spectrum of x-rays emitted when metal atoms are excited by an x-ray source. The energy of emitted x-rays reveals the identity of the metals in the sample, and the intensity of emitted x-rays is related to their concentrations. Rapid, multi-element analysis can be performed by XRF. The target chemical of concern (COC) was lead. An Innov-X XT400 was used to field screen the soil samples. The XRF instrument was operated in accordance with the manufacturer's instructions.

Soil samples were collected as described in Section 3.4, and analyzed in the plastic Ziplock (or equivalent) bags. Each sample was scanned once to determine if lead was present at that interval. A summary of the XRF field screening results is presented with the boring logs in Appendix B-2.

3.4.3 Surface Soil Sample Collection

Surface soil samples were collected for laboratory analysis at 22 locations at Site 21. Figure 3-4 shows the locations of the surface soil samples. Table 3-2 is a summary of the surface soil samples collected. Because most of the site surface is asphalt/pavement, soil samples were collected immediately below the pavement and taken directly from the acetate liner advanced by the DPT. One surface soil sample was collected for laboratory analysis from each DPT soil boring location at a depth of 0.5 to 1.0 foot bgs (the first 6 inces below asphalt).

3.4.4 Subsurface Soil Sample Collection

Subsurface soil samples were collected for laboratory analysis at 22 locations at Site 21. Table 3-2 contains a summary of the subsurface soil samples collected. With the exception of soil borings in the northwest corner where the DPT rig hit shallow refusal, one subsurface soil sample was collected from each DPT soil boring for laboratory analyses. Subsurface soil samples were collected in locations where staining or odors were observed, or where elevated PID or XRF readings occurred. If there were no elevated readings, and no staining or odors were observed, soil samples were collected from the interval directly above the groundwater table.

Soil borings were kept open for at least a day to collect depth to groundwater measurements. Soil borings were then filled with bentonite chips to the original surface level (aphalt or grass). Soil Sample Log Sheets are provided in Appendix B-3. The results of the subsurface soil sample analysis are presented in Section 4.

3.5 MONITORING WELL INSTALLATION AND SAMPLING

Permanent monitoring wells (NTC21-MW-01 through NTC21-MW-06) were installed in six locations at Site 21 to investigate the first water bearing (shallow groundwater) zone. Monitoring wells were installed to allow for the collection of groundwater samples for laboratory analysis to determine the presence of groundwater contamination, and to determine the depth to groundwater. After monitoring wells were installed and sampled, slug tests were conducted to determine groundwater aquifer characteristics.

The following subsections discuss the permanent monitoring well drilling, installation, construction, and sample collection.

3.5.1 Monitoring Well Drilling and Installation

Six monitoring wells were installed at Site 21 during this SI as shown on Figure 3-5. Table 3-3 provides a summary of monitoring well construction information. The hollow-stem auger drilling technique was used for monitoring well drilling operations. The depths of the monitoring wells ranged from 13 to 20 feet bgs. Documentation of the soil lithology utilized information from the DPT subsurface soil sampling activities described in section 3.4.4. The nominal diameter of the well borings was approximately 8 inches. Each monitoring well was constructed of 2-inch inside diameter, Schedule 40 polyvinyl chloride (PVC), flush-joint riser pipe; 10-foot-long flush-joint, factory-slotted, PVC well screen; and an end cap. Each section of casing and screen was National Sanitation Foundation approved and met American Society for Testing and Materials Standard A312-86a. The well screens had a slot size of 0.01 inch (10 slot) and were supplied with a flush-joint bottom cap.

After the riser pipe and screens were in place, the annulus of the boring was backfilled with U.S. Standard Sieve size No. 10-20 clean silica sand from the bottom of the boring, to a minimum of 2 feet above the top of the well screen. Four and a quarter-inch inside diameter (ID) hollow stem augers were used to hold the borehole open as the clean silica sand was placed around the well screen. As the sand pack was installed, the augers were slowly retrieved to provide an adequate sand pack around the well. A bentonite seal consisting of bentonite chips (minimum 2-foot thickness) was then installed above the sand pack and allowed to hydrate in accordance with the manufacturer's recommendations.

The depths of construction materials were constantly monitored during the installation of the monitoring wells by using a weighted, stainless steel or plastic tape to make sure that no bridging of the sand pack or bentonite seal occurred during the installation process.

After the bentonite was sufficiently hydrated, a flush-mounted protective steel casing equipped with a sealed, bolted down, and appropriately labeled cap was installed at the six permanent wells located at Site 21. Each flush-mount riser was secured with a locking J-plug. Flush-mounted covers were installed in accordance with the Illinois Department of Public Health Water Well Construction Code requirements. Each monitoring well was fitted with a 6-inch diameter by 10-inch long steel protective casing. The annulus between the flush-mounted cover and the ground was filled with concrete. The 8-inch diameter auger hole served as the outer form for the concrete. The soil cuttings from each monitoring well were collected in 55-gallon drums and labeled as investigation-derived waste (IDW). The composite sample collected from the direct-push technique borings was used to characterize this waste for appropriate disposal.

TTL Assocates, a licensed Illinois driller, installed the six monitoring wells at the site from November 13 through November 14, 2009. A Tetra Tech geologist supervised the drilling and well installation activities, prepared the drilling logs and well completion logs, and reviewed the field documentation. A Tetra Tech licensed Professional Geologist reviewed the drilling logs, well completion logs, and field documentation. Boring logs and well construction diagrams are provided in Appendix B-2 and B-4, respectively.

3.5.2 Water Level Measurements

One round of synoptic water level measurements was collected from the monitoring wells at the site to determine static potentiometric water surface elevations for shallow groundwater. The synoptic measurements were collected within a 2-hour period of consistent weather conditions to minimize atmospheric/precipitation effects on groundwater levels.

Measurements were collected with an electrical water level indicator (M-scope or equivalent) using the top of the well casing (i.e., riser pipe) as the reference point for determining the depth to water. Water level measurements were collected from a notch made at the top of each casing so that subsequent rounds of synoptic measurements could be collected from a consistent point. Water level measurements were recorded electronically to the nearest 0.01 foot. A summary of the groundwater level measurements collected is provided in Section 4.2.2.

3.5.3 Hydraulic Conductivity Testing

Rising head hydraulic conductivity (K) tests otherwise known as slug tests were completed at Naval Station Great Lakes, Site 21 to further characterize the subsurface groundwater conditions. Each rising head test was performed by removing a quantity of water from each monitoring well and measuring the rate at which the water level in the well returned to the initial water level. A dedicated bailer was utilized to remove the groundwater at each well location. The rate of recovery of the groundwater in the well versus time was measured using a 30-pound per square inch (psi) Well Troll pressure transducer. Prior to initiating the slug test, the pressure transducer was installed in the well. The static water levels were measured at each respective well location. The pressure transducer was programmed to start data collection immediately following removal of the water from the well. Slug test data are provided in Appendix B-5. During preparation of the SAP, it was assumed that both rising and falling head hydraulic conductivity tests would be completed in the monitoring wells. However, the water levels in the monitoring wells were below the top of the screen. Performing a falling head test under this condition increases the rate of fall of the water level in the borehole beyond that caused by inflow into the aquifer and leads to an overestimation of K. Based on the standard test procedures (Bouwer and Rice, 1989) conducting falling head tests is not appropriate under such conditions. A field modification form was completed and is in Appendix B-1.

3.5.4 Groundwater Sampling

Groundwater sampling of wells at Site 21 occurred from November 15 through 17, 2009 to determine which chemical constituents may be present at the Site. Table 3-2 contains a summary of the groundwater samples collected.

The monitoring wells were purged and sampled using standard purging techniques (low flow) in accordance with the UFP-SAP (Tetra Tech, 2009). Using a peristaltic pump and disposable polyethylene tubing, one to three screen casing volumes were purged from the well. Prior to purging, the intake of the sampling pump was placed at the approximate midpoint of the well screen or the midpoint of the water column present in the well, and at least 2 feet from the bottom of the well.

To start purging, monitoring well pumping was conducted at a low flow rate to minimize drawdown. Water quality parameters [pH, temperature, specific conductance, turbidity, oxidation reduction potential (ORP) and dissolved oxygen (DO)] were measured and recorded at 5- to 10-minute intervals. Groundwater

Sample Log Sheets which include these measurements are provided in Appendix B-6. Measurements were collected until the parameters stabilized for at least three consecutive readings and the minimum purge volume (one screen volume) was removed. Stabilization of the above parameters was defined as follows:

- pH ± 0.2 standard unit
- Temperature ± 10%
- Turbidity less than 10 nephelometric turbidity units
- ORP ± 10 %
- Specific conductance ± 10 %
- Dissolved oxygen ± 10%

If the turbidity remained greater than 10 nephelometric turbidity units, but the other field parameters stabilized, a filtered metal sample was collected in addition to the unfiltered metal sample (one sample required filtering for metal analysis during the SI). Purge water was containerized in 55-gallon drums and labeled IDW.

After the parameters stabilized and immediately prior to sampling, the temperature, pH, specific conductance, turbidity, ORP, and DO of the groundwater sample were measured and recorded on a Groundwater Sample Log Sheet in eData. The sample containers were filled by allowing the pump discharge to flow with minimal turbulence down the inside of the container. For the collection of filtered samples, an in-line 0.45-micron, disposable particulate filter was used.

The results of the groundwater sample analysis are presented in Section 4.

3.6 ANALYTICAL PARAMETERS AND METHODS

The following subsections discuss the analysis of soil, groundwater and Quality Assurance/Quality Control (QA/QC) samples that were collected for the project. Table 3-2 presents the analytical parameters. Samples collected for chemical analysis during the SI were analyzed for VOCs, SVOCs, inorganics, pesticides, herbicides, and PCBs by Empirical Laboratories of Nashville, Tennessee; and for dioxins/furans by SGS North America, Inc. (SGS) of Wilmington, North Carolina.

3.6.1 Soil Samples

The soil samples were collected as described in Section 3.4. Surface and subsurface soil samples collected for chemical analysis were analyzed for TAL metals, TCL VOCs, SVOCs, pesticides, PCBs, and herbicides. Although more subsurface samples analyzed for dioxins/furans were planned, ash/cinder was only observed in two surface and one subsurface soil sample; therefore, only those three samples were analyzed for dioxins/furans. One subsurface soil sample was analyzed for grain size.

3.6.2 Groundwater Samples

The groundwater samples were collected as described in Section 3.5.4. Groundwater samples collected for chemical analysis were analyzed for TAL metals, TCL VOCs, SVOCs, pesticides, PCBs, and herbicides. One sample (NTC21-MW-05) was analyzed for dioxins/furans.

3.6.3 IDW Samples

Following the investigation, composite soil and water samples were submitted for laboratory testing to characterize the IDW for appropriate disposal via Toxicity Characteristic Leaching Procedure (TCLP) analysis for VOCs, SVOCs, herbicides, pesticides, metals, reactivity, corrosivity, PCBs, and ignitability. The IDW was handled in accordance with the UFP-SAP (Tetra Tech, 2009). IDW Sample Log Sheets are provided in Appendix B-7. Completed Waste Profiles were signed and are provided in Appendix C.

3.7 FIELD QA/QC SAMPLE DESCRIPTION

Tetra Tech established a QC program to monitor and assess the quality of field work and laboratory work performed during the SI. This program included the collection of various types of QC samples as indicated below. The field quality control samples consisted of temperature blanks, field duplicates, matrix spike/matrix spike duplicate (MS/MSD) samples, trip blanks, equipment rinsate blanks, and source water blanks.

Temperature blanks were included in each cooler submitted to the laboratory to monitor sample storage conditions prior to arrival at the laboratory. Approximately one field duplicate sample was collected per ten samples. The purpose of the field duplicate sample was to examine the variability of the samples. One trip blank was collected per shipment of VOC samples. The purpose of the trip blank was to examine the potential for cross-contamination of samples during shipping.

One equipment rinsate blank was collected for each type of non-dedicated soil sampling equipment used. The purpose of the equipment rinsate blank was to examine the effectiveness of the decontamination procedures. One source water blank was collected per water source used for the purpose of evaluating contamination in water used for decontamination activities.

MS samples are investigative samples analyzed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The MS samples for organics are analyzed in duplicate. MS and MSD samples were collected at a frequency of 1 per 20 samples.

Each type of field QC sample had the same preservation, analysis, and reporting procedures as the related environmental samples with the exception of the temperature blanks. The log sheets for the QA/QC samples are included in Appendix B-8.

Laboratory QC samples consisted of laboratory control samples, laboratory duplicates, internal standards, laboratory method blanks, MS, MSD, post digestion spikes, and surrogates. Empirical Laboratories and SGS conducted the laboratory analysis and QC in accordance with the UFP-SAP (Tetra Tech, 2009). Tetra Tech reviewed the laboratory quality control during the data validation, and noncompliances were noted in the data validation reports in Appendix D.

3.8 FIELD MEASUREMENTS

The following subsections present discussions pertaining to field measurements that were performed as part of the SI.

Field parameters measured during the course of the SI were:

- VOC screening of worker's breathing space and recovered soil samples.
- XRF analysis of soil samples.
- Water quality (pH, temperature, specific conductance, turbidity, DO, ORP).

VOC screening was conducted using a MiniRae 2000 PID. The PID readings were recorded on the boring logs (Appendix B-2). There were no positive PID readings above background. Water quality parameters were measured using a YSI water quality meter. XRF analysis was conducted using an Innov-X XT400.

Each instrument was calibrated prior to its delivery to the field, daily, or as needed. The project eData or the calibration log sheets were used to document the calibration of field testing equipment (Appendix B-9).

3.9 DECONTAMINATION PROCEDURES

Proper decontamination of field equipment is an integral part of the overall QC process. Decontamination liquids were placed in 55-gallon drums with the purge water and stored in a secure designated area until final disposition. The containers were supplied by TTL Associates, and were clearly identified and labeled as IDW.

To achieve proper decontamination prior to and after the completion of the sampling events, sampling equipment was:

- Washed in solution of tap water and Liquinox soap or equivalent.
- Rinsed with tap water.
- Double rinsed with deionized or distilled water, or steam-cleaned.
- Air dried, if feasible.

Tap water for decontamination was obtained from a faucet connected to the Naval Station Great Lakes public water supply.

Field measurement equipment that directly contacted environmental media (i.e., M-scope, flow-through cells, etc.) was rinsed with distilled/deionized water after each usage.

3.10 FIELD DOCUMENTATION

Field documentation and tracking of sample custody are integral to the overall QA/QC process for the SI. The field documentation system serves as a record of activities conducted in the field during sample collection and data generation, and provides the means to identify, track, and monitor each sample from the time of collection through final reporting of data.

3.10.1 Sample Identification

The sample identification scheme presented in the UFP-SAP (Tetra Tech, 2009) was used to identify and label the field samples collected, and the field QC blanks created during the SI. The sample identification procedure was used for the sample labels and chain-of-custody documents in order to maintain consistency in the labeling process, and to allow efficient handling of a large number of samples from different sources. Sample identification was identified and followed in accordance with the UFP-SAP (Tetra Tech, 2009).

3.10.2 Electronic Field Logbooks/Sample Log Sheets

The sampling coordinator maintained an electronic field notebook and data sheets containing pertinent information regarding the samples. The field logs are intended to provide sufficient data and observations to enable the field team and other interested parties to reconstruct events that occurred during field activities.

Boring logs and well construction diagrams were prepared for the soil borings and monitoring wells. The physical characteristics of these samples (e.g., color, lithology, general appearance, odor, etc.) were recorded on an electronic sample log sheet. Similarly, electronic sample logs were prepared for groundwater samples.

3.11 LAND SURVEYING

Land surveying was conducted by James Anderson Company to determine the horizontal location, vertical elevation of the ground surface, and top of casing of the monitoring wells. Locations were reported in Illinois State Plane Coordinate System North American Datum 1983 (NAD 83), and vertical elevations were reported in North American Vertical Datum 1988 (NAVD 88). Monitoring well locations are shown on Figure 3-5. The survey information is provided in Appendix E.

3.12 SAMPLE MANAGEMENT

The following chain-of-custody procedures documented sample possession from the time of sample collection until ultimate disposal of the sample. For the purposes of these procedures, a sample was considered to be in custody if it was:

- In one's actual possession.
- In view after being in one's possession.
- Secured (i.e., locked up) so that no one could tamper with it.
- In a secured area, available to authorized personnel only.

Strict chain-of-custody procedures were maintained throughout the duration of the investigation. These procedures included the following:

- A chain-of-custody record was completed in the field. The original accompanied the samples, and copies were maintained at intermediate steps.

- At the point where the responsibility for custody of the samples changed, the new custodian signed the chain-of-custody record and noted the date and time.

SI samples were packed in an ice-filled cooler and sent by overnight carrier (Federal Express) to the analytical laboratory for chemical analysis. Chain-of-custody forms are provided in Appendix B-10.

3.13 INVESTIGATION-DERIVED WASTE MANAGEMENT

The types of wastes generated as a result of the SI activities were drill cuttings (soil), disposable sampling equipment, personal protective equipment (PPE), development and purge water, and decontamination liquids. The solid and liquid IDW was collected and placed into 55-gallon drums supplied by TTL Associates. The waste containers were clearly identified and labeled. The generated IDW was temporarily stored at a location designated by Naval Station Great Lakes personnel.

One composite soil sample was collected from the drums containing solid IDW and one composite liquid sample was collected from the drums containing liquid IDW and submitted to the laboratory for chemical analysis. The solid and liquid IDW samples were analyzed for TCLP VOCs, TCLP SVOCs, TCLP herbicides, TCLP pesticides, TCLP metals, reactivity, corrosivity, PCBs, and ignitability. Analytical results were provided to Naval Station Great Lakes personnel who were responsible for manifesting, transporting, and disposing the IDW.

TABLE 3-1

SAMPLING RATIONALE
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Sample Location	Sampling Rationale
Surface Soil	
NTC21SB-01 to NTC21SB-22	One surface soil sample was collected from each soil boring at the 0.5 foot interval directly below the asphalt/subbase. Samples were collected for TAL metals, and TCL VOCs, SVOCs, pesticides, PCBs, and herbicides. Select locations were collected for dioxin/furans.
Subsurface Soil	
NTC21SB-01 to NTC21SB-22	Utilized the XRF and PID to determine high concentrations of lead and VOCs respectively. Samples were collected in two foot intervals above groundwater based on XRF, PID, and visual observations. Samples were collected for TAL metals, and TCL VOCs, SVOCs, pesticides, PCBs, and herbicides. Select locations were collected for dioxin/furans. One subsurface sample was collected per location.
Groundwater	
NTC21MW-01 to NTC21MW-06	Samples collected from these wells to determine if contamination is present in groundwater. Samples were collected for TAL metals, TCL VOCs, SVOCs, pesticides, PCBs, and herbicides. Select location was collected for dioxin/furans.

PCB = Polychlorinated biphenyl.
PID = Photoionization detector.
SVOC = Semivolatile organic compound.
TAL = Target Analyte List.
TCL = Target Compound List.
VOC = Volatile organic compound.
XRF = X-Ray Fluorescence.

TABLE 3-2

SAMPLING SUMMARY
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS
PAGE 1 OF 2

Sample Name	Depth (feet bgs)	XRF and PID	TCL VOCs	TCL SVOCs	TAL Metals	TCL Pesticides and Herbicides	TCL PCBs	Dioxin/ Furans	Grain Size	Field Parameters[1]
SURFACE (0.5-1) [2]										
NTC21SB-01 to NTC21SB-22										
NTC21SB-01-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-02-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-03-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-04-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-05-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-06-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-07-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-08-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-09-SO-0001	0.5-1	X	X	X	X	X	X	X		
NTC21SB-10-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-11-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-12-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-13-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-14-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-15-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-16-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-17-SO-0001	0.5-1	X	X	X	X	X	X	X		
NTC21SB-18-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-19-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-20-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-21-SO-0001	0.5-1	X	X	X	X	X	X			
NTC21SB-22-SO-0001	0.5-1	X	X	X	X	X	X			
SUBSURFACE										
NTC21SB-01 to NTC21SB-22										
NTC21SB-01-SO-0102	1-2	X	X	X	X	X	X			
NTC21SB-02-SO-0204	2-4	X	X	X	X	X	X	X		
NTC21SB-03-SO-0204	2-4	X	X	X	X	X	X			
NTC21SB-04-SO-0406	4-6	X	X	X	X	X	X			
NTC21SB-05-SO-0204	2-4	X	X	X	X	X	X			
NTC21SB-06-SO-0204	2-4	X	X	X	X	X	X			
NTC21SB-07-SO-0204	2-4	X	X	X	X	X	X			
NTC21SB-08-SO-0204	2-4	X	X	X	X	X	X		X	
NTC21SB-09-SO-0204	2-4	X	X	X	X	X	X			
NTC21SB-10-SO-0406	4-6	X	X	X	X	X	X			
NTC21SB-11-SO-0204	2-4	X	X	X	X	X	X			

SAMPLING SUMMARY
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Sample Name	Depth (feet bgs)	XRF and PID	TCL VOCs	TCL SVOCs	TAL Metals	TCL Pesticides and Herbicides	TCL PCBs	Dioxin/ Furans	Grain Size	Field Parameters[1]
SUBSURFACE (Continued)										
NTC21SB-12-SO-0204	2-4	X	X	X	X	X	X			
NTC21SB-13-SO-0204	2-4	X	X	X	X	X	X			
NTC21SB-14-SO-0204	2-4	X	X	X	X	X	X			
NTC21SB-15-SO-0204	2-4	X	X	X	X	X	X			
NTC21SB-16-SO-0204	2-4	X	X	X	X	X	X			
NTC21SB-17-SO-0507	5-7	X	X	X	X	X	X			
NTC21SB-18-SO-0507	5-7	X	X	X	X	X	X			
NTC21SB-19-SO-0204	2-4	X	X	X	X	X	X			
NTC21SB-20-SO-0406	4-6	X	X	X	X	X	X			
NTC21SB-21-SO-0608	6-8	X	X	X	X	X	X			
NTC21SB-22-SO-0204	2-4	X	X	X	X	X	X			
GROUNDWATER										
NTC21MW-01			X	X	X	X	X			X
NTC21MW-02			X	X	X	X	X			X
NTC21MW-03			X	X	X	X	X			X
NTC21MW-04			X	X	X	X	X			X
NTC21MW-05			X	X	X	X	X	X		X
NTC21MW-06			X	X	X	X	X			X

Notes:
bgs - below ground surface
PCB - polychlorinated biphenyls
PID - Photoionization detector
SVOCs - Polynuclear aromatic hydrocarbons
TAL - Target Analyte List
TCL - Target Compound List
VOCs - Volatile organic compounds
XRF - X-Ray Fluorescence Spectrometer
(1) Field parameters include temperature, pH, specific conductance, turbidity, oxidation-reduction potential, and dissolved oxygen.
(2) First interval below asphalt

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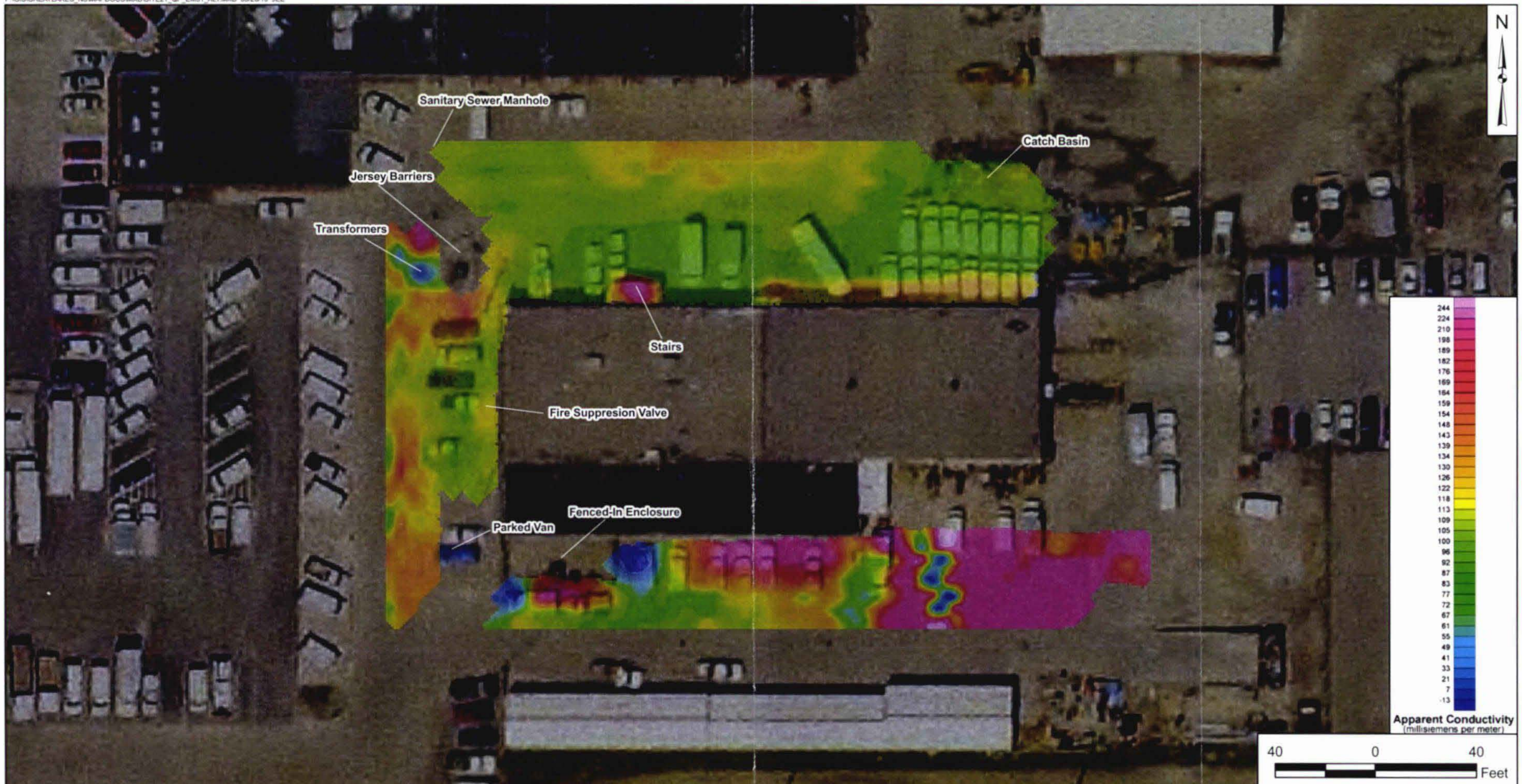


NOTES:
1. EM31-MK2 quadrature-phase response shown. EM31 data collected along approximately 5-foot spaced survey lines.
2. 2007 aerial photo.

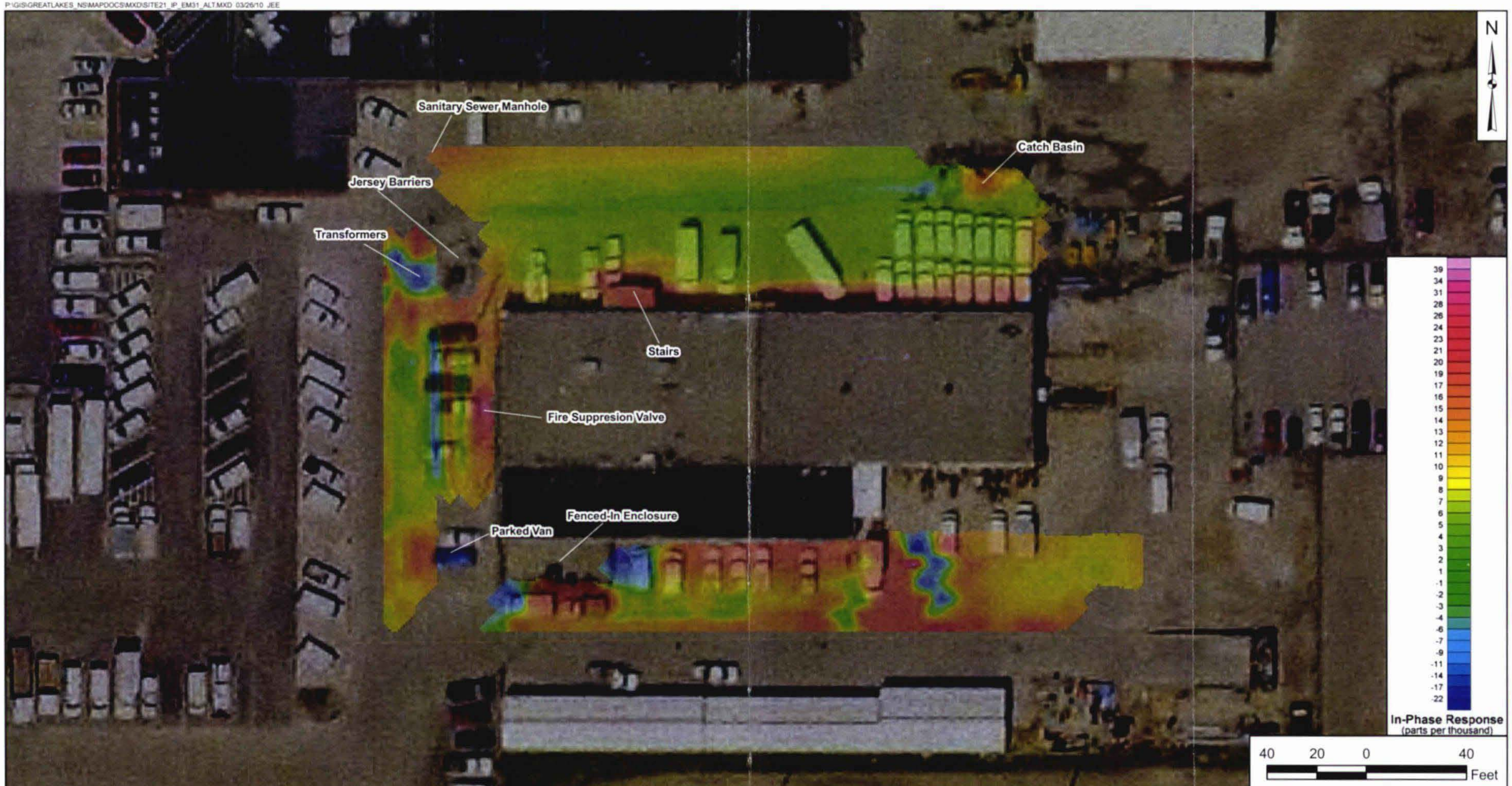
DRAWN BY	DATE
J. ENGLISH	11/04/08
CHECKED BY	DATE
J. COFFMAN	03/26/10
COST/SCHED AREA	
SCALE AS NOTED	

NAVFAC

EM31 COLOR CONTOUR MAP
(QUADRATURE PHASE)
SITE 21 - BUILDINGS 1517 / 1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER CTO C064	
APPROVED BY	DATE
B. CUMMINGS	03/26/10
APPROVED BY	DATE
FIGURE NO. FIGURE 3-1	REV 0

P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE21_IP_EM31_ALT.MXD 03/26/10 JEE



NOTES:
1. EM31-MK2 in-phase response shown. EM31 data collected along approximately 5-foot spaced survey lines.
2. 2007 aerial photo.

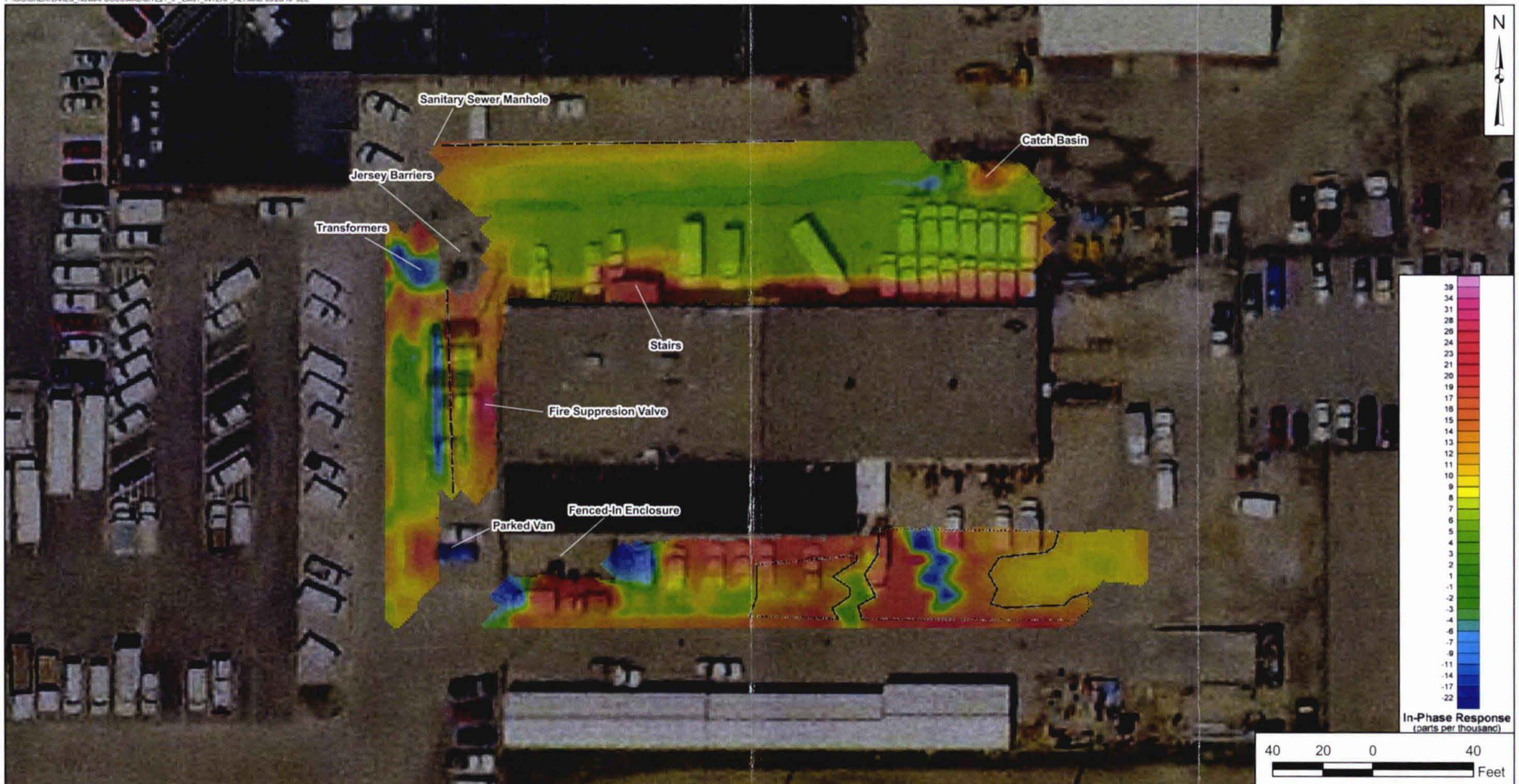
DRAWN BY	DATE
J. ENGLISH	03/26/10
CHECKED BY	DATE
J. COFFMAN	03/26/10
COST/SCHED AREA	
SCALE AS NOTED	

NAVFAC

EM31 COLOR CONTOUR MAP
(IN-PHASE)
SITE 21 - BUILDINGD 1517 / 1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER CTO C064	
APPROVED BY	DATE
B. CUMMINGS	03/26/10
APPROVED BY	DATE
FIGURE NO. FIGURE 3-2	REV 0

P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE21_IP_EM31_INTERP_ALT.MXD 03/26/10 JEE



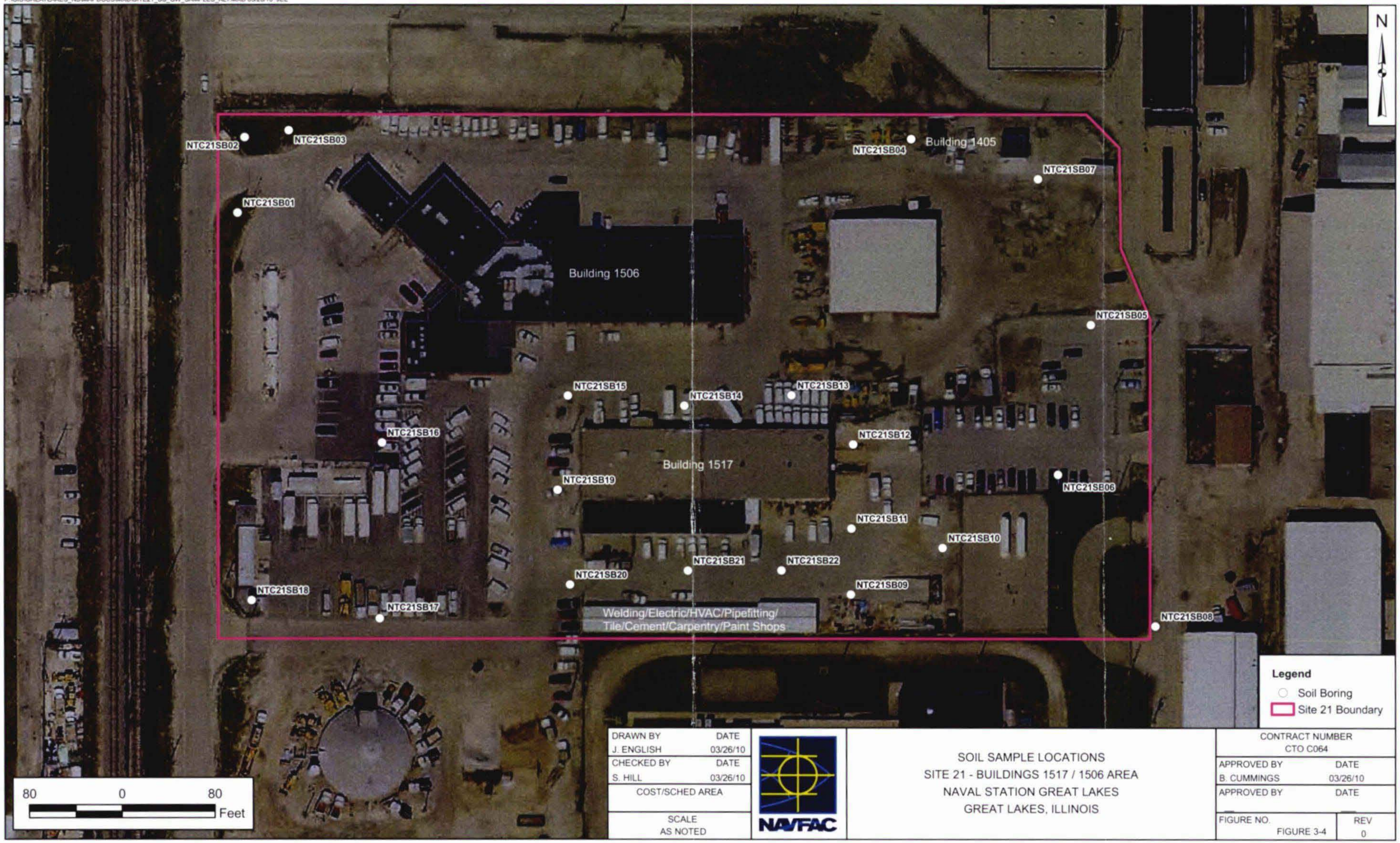
NOTES:
1. EM31-MK2 in-phase response shown. EM31 data collected along approximately 5-foot spaced survey lines.
2. 2007 aerial photo.

Legend

- – – Possible Utility
- .... Area of Possible Buried Metal

DRAWN BY J. ENGLISH	DATE 03/26/10	NAVFAC	EM31 COLOR CONTOUR INTERPRETATION MAP (IN-PHASE) SITE 21 - BUILDINGS 1517 / 1506 AREA NAVAL STATION GREAT LAKES GREAT LAKES, ILLINOIS	CONTRACT NUMBER CTO C064	
CHECKED BY J. COFFMAN	DATE 03/26/10			APPROVED BY B. CUMMINGS	DATE 03/26/10
COST/SCHED AREA				APPROVED BY	DATE
SCALE AS NOTED				FIGURE NO. FIGURE 3-3	REV 0

P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE21_SS_GW_SAMPLES_ALT.MXD 03/26/10 JEE



P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE21_WELL_LOCATIONS_ALT.MXD 03/26/10 JEE

DRAWN BY J. ENGLISH	DATE 03/26/10		CONTRACT NUMBER CTO C064
CHECKED BY S. HILL	DATE 03/26/10		APPROVED BY B. CUMMINGS — DATE 03/26/10
COST/SCHED AREA			APPROVED BY — DATE
SCALE AS NOTED			FIGURE NO. FIGURE 3-5 — REV 0

NAVFAC

MONITORING WELL LOCATIONS
SITE 21 - BUILDINGS 1517 / 1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

4.0 SITE INSPECTION RESULTS

The following subsections provide a detailed discussion of field data and analytical results that were generated during the course of the SI at Site 21 at Naval Station Great Lakes. Figures 1-1, 1-2, and 2-1 show the general location of Naval Station Great Lakes and the location of Buildings 1517/1506 Area.

The analytical data presented in this SI Report were subjected to a data validation process performed by Tetra Tech personnel for the integrity and defensibility of the data. Samples collected for chemical analysis during the SI were analyzed for TAL inorganics, and TCL VOCs, SVOCs, pesticides, herbicides, and PCBs by Empirical Laboratories of Nashville, Tennessee; and for dioxins/furans by SGS of Wilmington, North Carolina. Detected concentrations in surface soil, subsurface soil, and groundwater samples relative to minimum regulatory screening values are discussed in Sections 4.3.1, 4.3.2, and 4.3.3, respectively.

Detected concentrations in surface soil, subsurface soil, and groundwater samples relative to the Illinois TACO are discussed in Sections 4.4.1, 4.4.2, and 4.4.3, respectively.

4.1 SITE-SPECIFIC GEOLOGY

Geologic conditions at Site 21 were characterized as part of the SI. Surface and subsurface materials at Site 21 were characterized based on acetate liner samples collected during the drilling of soil and well borings during the Tetra Tech field investigation. The visual classifications were utilized to develop geologic cross-sections for the site. Figure 4-1 presents the locations of the geologic cross sections based on select borings across Site 21. Figures 4-2, 4-3, and 4-4 show cross-sectional transects A-A', B-B', and C-C', respectively, that were developed from the soil boring data.

The surface of Site 21 is covered primarily with buildings and pavement, except for the northwestern and southeastern corners where there are grassy areas, and the northeastern corner where there is a soil/gravel-covered area.

With the exception of the southwestern portion of the Site, most of the Site has a layer of fill material below the asphalt/grassy top to a depth of 1 to 5 feet bgs. Typically this fill is a sand, gravelly sand, and/or silty sand with areas of coal, ash, slag, brick fragments, etc. Below this fill material is a natural clay/silt unit that is common in the Great Lakes area, which was observed to 28 feet bgs during this SI. , The soil borings and wells installed on Site 21 as part of the Building 1600A UST closure encountered similar subsurface conditions, with the exception of soil boring SB11. Soil boring SB11 reportedly encountered fill to a depth of 12 feet. Because of the lack of material recovery (19 percent) over the last 8 feet of the boring, the total thickness of the fill at that location could not be confirmed.

Laboratory sieve analysis of one sample location at Site 21 (Table 4-1) and three sample locations at Site 9 (adjacent site) indicates that the Unified Soil Classification System description of the soil encountered during the investigation ranges from SP/SM (sandy silt) near the surface to SM (silty sand), SM/SC (silty, clayey sand), and ML/CL (silt clay mix) in the subsurface soil.

4.2 SITE-SPECIFIC HYDROGEOLOGY

The hydrogeologic conditions at Site 21 were interpreted from data collected during these subsurface investigation activities at the site: drilling, groundwater sampling, measuring groundwater levels, and aquifer testing.

4.2.1 Hydrogeologic Framework

The shallow water table aquifer was characterized at Site 21. A deeper (confined) aquifer is most likely present (based on previous studies at adjacent areas), but was not part of this investigation. The groundwater level measurements from the six wells installed onsite show that the top of the shallow aquifer ranges from approximately 1.35 to 6.25 feet bgs, and is composed primarily of a silty clay unit (see Figures 4-2, 4-3, and 4-4).

4.2.2 Groundwater Flow Directions

Groundwater flow direction for the shallow water table aquifer was determined based on the synoptic water-level measurements collected on November 17, 2009 (Table 4-2). Water-level measurements were collected from the wells within a 2-hour time frame. Groundwater elevations were determined based on the six depth-to-water measurements. The flow direction of groundwater onsite is typically in the southeast direction. Figure 4-5 presents the groundwater potentiometric surface for the shallow water table aquifer at the site.

4.2.3 Hydraulic Conductivity

Hydraulic conductivity (aquifer) test data were evaluated using the Bouwer and Rice Method (1989) for unconfined aquifers. This method permits measurement of hydraulic conductivity (K) of aquifer materials. The method consists of quickly lowering the water level in the well, and measuring the subsequent rise of water in the well. The method was developed to measure K of the aquifer around the screen or otherwise open portion of a full penetrating or partially penetrating well.

Hydraulic conductivity (aquifer) tests (described in Section 3.5.3) were completed at four wells at Site 21: NTC21-MW-01, NTC21-MW-02, NTC21-MW-05 and NTC21-MW-06. K values calculated for the wells ranged from 1.73 x 10^{-2} cm/sec to 8.75 x 10^{-4} cm/sec, and averaged 6.97 x 10^{-3} cm/sec. Hydraulic conductivity (aquifer) test results are summarized in Table 4-3.

4.3 SOIL AND GROUNDWATER RESULTS COMPARISON TO MINIMUM REGULATORY SCREENING VALUES

4.3.1 Surface Soil Sampling Results

Surface soil analytical results were compared to the Illinois TACO, Illinois Non-TACO, and United States Environmental Protection Agency (USEPA) screening criteria as shown in Table 4-4. Analytical results for surface soil samples collected at Site 21 are summarized in Tables 4-5 and 4-6. Surface soil sample locations are shown on Figure 3-4. Detailed surface soil analytical results are provided in Appendix F-1. The following sections provide summaries of the chemicals that exceeded minimum regulatory screening values (primarily residential) in surface soil.

VOCs

The table below presents a summary of data for VOC contaminants that were detected at concentrations exceeding the minimum regulatory screening values. The data presented include: frequency of contaminant detection, maximum results, identity of the sample location having the maximum results, the screening value used, and the number of samples that exceeded the screening criteria.

VOC Exceedances in Surface Soils

Parameter	Frequency of Detection	Maximum Result (ug/kg)	Sample with Maximum Detection	Minimum Regulatory Screening Values	
				Value (ug/kg)	Exceedances
BENZENE	5/22	1.1	NTC21SB-01-SO-0102	0.21	5
TETRACHLOROETHENE	1/22	1.4	NTC21SB-19-SO-0001	0.049	1

Tetrachloroethene was detected at only one sample location (NTC21-SB-19) at a concentration of 1.4 J ug/kg, which exceeds the minimum regulatory screening value. NTC21-SB-19 is located along the west side of Building 1517. Benzene was detected in five surface soil samples at concentrations ranging from

0.56 J to 1.1 J ug/kg, which exceeded minimum regulatory screening values. The maximum concentration of benzene was detected in surface soil sample NTC21SB-01-SO-0102 located slightly northwest of the fueling area.

SVOCs

The table below presents a summary of data for SVOC contaminants that were detected at concentrations exceeding the minimum regulatory screening values. The data presented include: frequency of contaminant detection, maximum results, identity of the sample location having the maximum results, the screening value used, and the number of samples that exceeded the screening criteria.

SVOC Exceedances in Surface Soils

Parameter	Frequency of Detection	Maximum Result (ug/kg)	Sample with Maximum Detection	Minimum Regulatory Screening Values	
				Value (ug/kg)	Exceedances
2-METHYLNAPHTHALENE	22/22	900	NTC21SB-14-SO-0001	750	3
BENZO(A)ANTHRACENE	20/22	22,000	NTC21SB-21-SO-0001	10	20
BENZO(A)PYRENE	17/22	38,000	NTC21SB-21-SO-0001	3.5	17
BENZO(B)FLUORANTHENE	20/22	59,000	NTC21SB-21-SO-0001	35	20
BENZO(K)FLUORANTHENE	20/22	21,000	NTC21SB-21-SO-0001	350	11
BIS(2-ETHYLHEXYL)PHTHALATE	16/22	3,400	NTC21SB-21-SO-0001	1,100	1
CARBAZOLE	4/22	2,400	NTC21SB-21-SO-0001	600	3
CHRYSENE	20/22	31,000	NTC21SB-21-SO-0001	1,100	5
DIBENZO(A,H)ANTHRACENE	12/22	1,100	NTC21SB-01-SO-0102	11	12
INDENO(1,2,3-CD)PYRENE	16/22	36,000	NTC21SB-21-SO-0001	120	16
NAPHTHALENE	22/22	520	NTC21SB-01-SO-0102	0.47	22

2-Methylnaphthalene was detected at concentrations exceeding minimum regulatory screening values in samples collected from NTC21-SB-07, NTC21-SB-13, and NTC21-SB-14. Surface soil sample NTC21-SB-21 contained a bis(2-ethylhexyl)phthalate concentration of 3,400 J ug/kg, which exceeds minimum regulatory screening values. Both carbozole and chrysene were detected at concentrations exceeding minimum regulatory screening values in surface soil samples collected from NTC21-SB-01, NTC21-SB-07, and NTC21-SB-21. Chrysene was also detected in surface soil samples collected from NTC21-SB-03 and NTC21-SB-11 at concentrations exceeding minimum regulatory screening values.

Concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene that exceeded minimum regulatory screening values were widespread throughout Site 21. However, higher concentrations of these contaminants were detected at the following five sample locations: NTC21-SB-01 and -03, located in the northwest corner of the site; NTC21-SB-07, located in the northeast corner of the site; NTC21-SB-11 and -21, located slightly south of Building 1517.

Pesticides/PCBs

The table below presents a summary of data for pesticides and PCB contaminants that were detected at concentrations exceeding the minimum regulatory screening values. The data presented include: frequency of contaminant detection, maximum results, identity of the sample location having the maximum results, the screening value used, and the number of samples that exceeded the screening criteria.

Pesticides/PCB Exceedances in Surface Soils

Parameter	Frequency of Detection	Maximum Result (ug/kg)	Sample with Maximum Detection	Minimum Regulatory Screening Values	
				Value (ug/kg)	Exceedances
4,4'-DDD	22/22	520	NTC21SB-10-SO-0001	66	7
4,4'-DDE	22/22	350	NTC21SB-10-SO-0001	47	8
4,4'-DDT	22/22	740	NTC21SB-10-SO-0001	67	6
ALPHA-BHC	7/22	12	NTC21SB-05-SO-0001	0.062	7
ALPHA-CHLORDANE	12/22	27	NTC21SB-22-SO-0001	13	1
AROCLOR-1260	14/22	720	NTC21SB-10-SO-0001	24	13
BETA-BHC	3/22	1	NTC21SB-03-SO-0001	0.22	3
DELTA-BHC	7/22	3.5	NTC21SB-10-SO-0001	0.062	7
DIELDRIN	15/22	15	NTC21SB-21-SO-0001	0.17	15
ENDRIN	8/22	224	NTC21SB-10-SO-0001	81	1
GAMMA-BHC (LINDANE)	9/22	20	NTC21SB-21-SO-0001	0.36	7
GAMMA-CHLORDANE	19/22	189	NTC21SB-10-SO-0001	13	3
HEPTACHLOR EPOXIDE	13/22	3	NTC21SB-06-SO-0001	0.15	12

Alpha-chlordane and endrin were each detected in only one sample at concentrations exceeding minimum regulatory screening values. Concentrations of 4,4'-DDD, 4,4'-DDE, and/or 4,4'-DDT exceeded minimum regulatory screening values in the following eight locations which are located in the southern and eastern portions of the site: NTC21-SB-05, NTC21-SB-06, NTC21-SB-08, NTC21-SB-09, NTC21-SB-10, NTC21-SB-11, NTC21-SB-21, and NTC21-SB-22. Beta-BHC was detected at three sample locations (NTC21-SB-01, NTC21-SB-03, and NTC21-SB-07) at concentrations exceeding minimum regulatory screening values. Gamma-chlordane was also detected at three sample locations (NTC21-SB-04, NTC21-SB-10, and NTC21-SB-22) at concentrations exceeding minimum regulatory screening values.

Alpha-BHC, Aroclor-1260, delta-BHC, dieldrin, gamma-BHC, and heptachlor epoxide concentrations detected above minimum regulatory screening criteria were widespread throughout the site. However, higher concentrations of these contaminants were detected in the southeast portion of the site.

Herbicides

The table below presents a summary of data for herbicide contaminants that were detected at concentrations exceeding the minimum regulatory screening values. The data presented include: frequency of contaminant detection, maximum results, identity of the sample location having the maximum results, the screening value used, and the number of samples that exceeded the screening criteria.

Herbicide Exceedances in Surface Soils

Parameter	Frequency of Detection	Maximum Result (ug/kg)	Sample with Maximum Detection	Minimum Regulatory Screening Values	
				Value (ug/kg)	Exceedances
2,4-D	1/22	217	NTC21SB-13-SO-0001	18	1

A concentration of 2,4-D (217 ug/kg) exceeded the minimum regulatory screening value in surface soil sample collected from NTC21-SB-13, located slightly north of Building 1517.

Dioxins/Furans

The table below presents a summary of data for dioxin/furan contaminants that were detected at concentrations exceeding the minimum regulatory screening values. The data presented include: frequency of contaminant detection, maximum results, identity of the sample location having the maximum results, the screening value used, and the number of samples that exceeded the screening criteria.

Dioxin/Furan Exceedances in Surface Soils

Parameter	Frequency of Detection	Maximum Result (ng/kg)	Sample with Maximum Detection	Minimum Regulatory Screening Values	
				Value (ng/kg)	Exceedances
1,2,3,4,6,7,8,9-OCDD	2/2	1,310	NTC21SB-09-SO-0001	870	1
1,2,3,4,6,7,8-HPCDD	2/2	169	NTC21SB-09-SO-0001	26	1
1,2,3,4,6,7,8-HPCDF	2/2	82.4	NTC21SB-09-SO-0001	26	1
1,2,3,4,7,8-HXCDF	2/2	5.91	NTC21SB-09-SO-0001	2.6	1
1,2,3,6,7,8-HXCDD	2/2	7.9	NTC21SB-09-SO-0001	2.6	1

Parameter	Frequency of Detection	Maximum Result (ng/kg)	Sample with Maximum Detection	Minimum Regulatory Screening Values	
				Value (ng/kg)	Exceedances
1,2,3,7,8,9-HXCDF	2/2	2.68	NTC21SB-09-SO-0001	2.6	1
1,2,3,7,8-PECDD	2/2	5.9	NTC21SB-09-SO-0001	0.26	2
2,3,4,6,7,8-HXCDF	2/2	26.2	NTC21SB-09-SO-0001	2.6	1
2,3,4,7,8-PECDF	2/2	57.5	NTC21SB-09-SO-0001	0.87	2
2,3,7,8-TCDD	2/2	0.816	NTC21SB-09-SO-0001	0.26	1
2,3,7,8-TCDF	1/2	3.17	NTC21SB-09-SO-0001	2.6	1

Dioxin/furan concentrations exceeding minimum regulatory screening values were detected in surface soil samples collected from NTC21-SB-09 and NTC21-SB-17. Sample location NTC21-SB-09 is located slightly southeast of Building 1517 and NTC21-SB-17 is located directly north of Building 1516.

Inorganics

The table below presents a summary of data for inorganic contaminants that were detected at concentrations exceeding the minimum regulatory screening values. The data presented include: frequency of contaminant detection, maximum results, identity of the sample location having the maximum results, the screening value used, and the number of samples that exceeded the screening criteria.

Inorganic Exceedances in Surface Soils

Parameter	Frequency of Detection	Maximum Result (mg/kg)	Sample with Maximum Detection	Minimum Regulatory Screening Values	
				Value (mg/kg)	Exceedances
ANTIMONY	6/22	5.22	NTC21SB-10-SO-0001	0.27	6
ARSENIC	22/22	48.4	NTC21SB-14-SO-0001	0.0013	22
BARIUM	22/22	234 J	NTC21SB-14-SO-0001	82	7
BERYLLIUM	22/22	4.71 J	NTC21SB-14-SO-0001	3.2	2
CADMIUM	21/22	13	NTC21SB-10-SO-0001	0.38	19
CHROMIUM	22/22	163	NTC21SB-09-SO-0001	28	2
COBALT	22/22	17.7	NTC21SB-13-SO-0001	0.49	22
COPPER	22/22	835	NTC21SB-10-SO-0001	46	9
IRON	22/22	69,500	NTC21SB-15-SO-0001	640	22
LEAD	22/22	428	NTC21SB-10-SO-0001	14	22
MANGANESE	22/22	2,420	NTC21SB-14-SO-0001	57	22
MERCURY	22/22	8.98	NTC21SB-10-SO-0001	0.03	22
NICKEL	22/22	56.2	NTC21SB-09-SO-0001	8	19
ZINC	22/22	1,230	NTC21SB-10-SO-0001	680	3

Exceedances of inorganics were widespread throughout the site. However, most inorganics were detected at concentrations an order of magnitude or higher than the minimum regulatory screening values in surface soil samples collected slightly southwest of Building 1517.

4.3.2 Subsurface Soil Sampling Results

Subsurface soil analytical results were compared to Illinois TACO, Illinois Non-TACO, and USEPA screening criteria as shown in Table 4-4. Analytical results for subsurface samples collected at Site 21 are summarized in Tables 4-7 and 4-8. Subsurface soil sample locations are shown on Figure 3-4. Detailed subsurface soil analytical results are provided in Appendix F-2. The following sections provide summaries of the chemicals that exceeded minimum regulatory screening values (primarily residential) in subsurface soils.

VOCs

The table below presents a summary of data for VOC contaminants that were detected at concentrations exceeding the minimum regulatory screening values. The data presented include: frequency of contaminant detection, maximum results, identity of the sample location having the maximum results, the screening value used, and the number of samples that exceeded the screening criteria.

VOC Exceedances in Subsurface Soils

Parameter	Frequency of Detection	Maximum Result (ug/kg)	Sample with Maximum Detection	Minimum Regulatory Screening Values	
				Value (ug/kg)	Exceedances
BENZENE	10/22	4.8	NTC21SB-18-SO-0507	0.21	10
ETHYLBENZENE	4/22	1.9	NTC21SB-17-SO-0507	1.7	1
TETRACHLOROETHENE	2/22	18	NTC21SB-19-SO-0204	0.049	2

Ethylbenezene was detected in only one sample at a concentration (1.9 J ug/kg) exceeding the minimum regulatory screening value. The sample (NTC21SB-17-SO-0507) was collected slightly north of Building 1516 at a depth ranging from 5 to 7 ft bgs. Tetrachloroethene was detected at concentrations exceeding the minimum regulatory screening value in samples collected from NTC21-SB-02 and NTC21-SB-19, located in the northwest corner of the site and west of Building 1517. Benzene was detected in ten samples at concentrations ranging from 0.41 J to 4.8 ug/kg, all of which exceed minimum regulatory screening values. Higher concentrations of benzene (3 to 4.8 ug/kg) were detected in samples collected from the southeast corner of the site at depths ranging from 5 to 7 ft bgs.

SVOCs

The table below presents a summary of data for SVOC contaminants that were detected at concentrations exceeding the minimum regulatory screening values. The data presented include: frequency of contaminant detection, maximum results, identity of the sample location having the maximum results, the screening value used, and the number of samples that exceeded the screening criteria.

SVOC Exceedances in Subsurface Soils

Parameter	Frequency of Detection	Maximum Result (ug/kg)	Sample with Maximum Detection	Minimum Regulatory Screening Values	
				Value (ug/kg)	Exceedances
2-METHYLNAPHTHALENE	16/22	2,100	NTC21SB-03-SO-0204	750	2
BENZO(A)ANTHRACENE	19/22	32,000	NTC21SB-03-SO-0204	10	17
BENZO(A)PYRENE	13/22	27,000	NTC21SB-03-SO-0204	3.5	13
BENZO(B)FLUORANTHENE	17/22	41,000	NTC21SB-03-SO-0204	35	14
BENZO(K)FLUORANTHENE	17/22	14,000	NTC21SB-03-SO-0204	350	6
CARBAZOLE	2/22	1,000	NTC21SB-07-SO-0204	600	1
CHRYSENE	21/22	34,000	NTC21SB-03-SO-0204	1,100	3
DIBENZO(A,H)ANTHRACENE	9/22	3,300	NTC21SB-03-SO-0204	11	8
INDENO(1,2,3-CD)PYRENE	13/22	16,000	NTC21SB-03-SO-0204	120	11
NAPHTHALENE	16/22	4,600	NTC21SB-22-SO-0204	0.47	16

Concentrations of 2-methylnapthalene exceeded minimum regulatory screening values in samples collected from NTC21SB-02-SO-0204 and NTC21SB-03-SO-0204, which are located in the northwest corner of the site. Carbazole and chrysene were detected at concentrations exceeding minimum regulatory screening values in NTC21SB07-SO-0204 located in the northeast corner of the site. Chrysene was also detected elevated concentrations in subsurface soil samples NTC21SB-02-SO-0406 and NTC21SB-03-SO-0204.

Polynuclear aromatic hydrocarbon (PAH) concentrations (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenzo[a,h]anthracene, indeno[1,2,3-cd]pyrene, and naphthalene) that exceeded minimum regulatory screening values were widespread throughout Site 21. However, concentrations of these contaminants, an order of magnitude or higher than the minimum regulatory screening values, were detected at the following three sample locations: NTC21-SB-02 (4 to 6 ft bgs) and NTC21-SB-03 (2 to 4 ft bgs), located in the northwest corner of the site and NTC21-SB-07 (2 to 4 ft bgs), located in the northeast corner of the site.

Pesticides/PCBs

The table below presents a summary of data for pesticides and PCB contaminants that were detected at concentrations exceeding the minimum regulatory screening values. The data presented include: frequency of contaminant detection, maximum results, identity of the sample location having the maximum results, the screening value used, and the number of samples that exceeded the screening criteria.

Pesticides/PCB Exceedances in Subsurface Soils

Parameter	Frequency of Detection	Maximum Result (ug/kg)	Sample with Maximum Detection	Minimum Regulatory Screening Values	
				Value (ug/kg)	Exceedances
4,4'-DDD	9/22	480	NTC21SB-06-SO-0204	66	3
4,4'-DDE	10/22	300	NTC21SB-06-SO-0204	47	2
4,4'-DDT	10/22	240	NTC21SB-06-SO-0204	67	1
ALDRIN	1/22	0.83	NTC21SB-02-SO-0406	0.65	1
ALPHA-BHC	6/22	2.8	NTC21SB-02-SO-0204	0.062	6
ALPHA-CHLORDANE	7/22	26	NTC21SB-22-SO-0204	13	2
AROCLOR-1242	1/22	47	NTC21SB-02-SO-0406	5.3	1
AROCLOR-1260	8/22	440	NTC21SB-06-SO-0204	24	8
BETA-BHC	2/22	1.1	NTC21SB-10-SO-0406	0.22	2
DELTA-BHC	5/22	3	NTC21SB-06-SO-0204	0.062	5
DIELDRIN	8/22	5.6	NTC21SB-06-SO-0204	0.17	8
GAMMA-BHC (LINDANE)	4/22	2.3	NTC21SB-06-SO-0204	0.36	3
GAMMA-CHLORDANE	12/22	46	NTC21SB-22-SO-0204	13	2
HEPTACHLOR EPOXIDE	7/22	6.9	NTC21SB-22-SO-0204	0.15	7

4,4'-DDD, 4,4'-DDE, and/or 4,4'-DDT were detected at concentrations exceeding minimum regulatory screening values in NTC21SB-06-SO-0204, NTC21SB-11-SO-0204, and NTC21SB-22-SO-0204, which are located south and east of Building 1517. Aldrin and Aroclor-1242 were only detected in sample NTC21SB-02-SO-0406, located in the northwest corner of the site, at concentrations above minimum regulatory screening values. Alpha-chlordane and gamma-chlordane were detected at concentrations exceeding regulatory screening values at sample locations NTC21-SB-11 (2 to 4 ft bgs) and NTC21-SB-22 (2 to 4 ft bgs). Beta-BHC and gamma-BHC were detected in samples collected from NTC21-SB-06 and NTC21-SB-10 at concentrations exceeding minimum regulatory screening values. Gamma-BHC concentrations also exceeded the screening value in sample NTC21SB-02-SO-0406.

Concentrations of alpha-BHC, Aroclor-1260, delta-BHC, dieldrin, and heptachlor epoxide that exceeded minimum regulatory screening values were widespread. However, three or more of these contaminants were detected at concentrations at an order of magnitude or higher than screening values in subsurface soil samples NTC21SB-06-SO-0204 and NTC21SB-22-SO-0204, which are located in the southern and eastern portions of the site.

Herbicides

2,4-D and dicamba were detected at concentrations exceeding reporting limits. However, concentrations of these contaminants were below the minimum regulatory screening values.

Dioxins/Furans

The table below presents a summary of data for dioxin/furan contaminants that were detected at concentrations exceeding the minimum regulatory screening values. The data presented include: frequency of contaminant detection, maximum results, identity of the sample location having the maximum results, the screening value used, and the number of samples that exceeded the screening criteria.

Dioxin/Furan Exceedances in Subsurface Soils

Parameter	Frequency of Detection	Maximum Result (ng/kg)	Sample with Maximum Detection	Minimum Regulatory Screening Values	
				Value (ng/kg)	Exceedances
1,2,3,4,6,7,8,9-OCDD	1/1	1,950	NTC21SB-02-SO-0204	870	1
1,2,3,4,6,7,8-HPCDD	1/1	167	NTC21SB-02-SO-0204	26	1
1,2,3,6,7,8-HXCDD	1/1	3.62	NTC21SB-02-SO-0204	2.6	1
1,2,3,7,8-PECDD	1/1	0.579	NTC21SB-02-SO-0204	0.26	1
2,3,4,7,8-PECDF	1/1	2.75	NTC21SB-02-SO-0204	0.87	1
2,3,7,8-TCDD	1/1	0.279	NTC21SB-02-SO-0204	0.26	1

Dioxin/furan concentrations exceeding minimum regulatory screening values were detected in subsurface soil sample NTC21-SB-02 (2 to 4 ft bgs), which is located in the northwest corner of the site, and is the former location of an incinerator.

Inorganics

The table below presents a summary of data for inorganic contaminants that were detected at concentrations exceeding the minimum regulatory screening values. The data presented include: frequency of contaminant detection, maximum results, identity of the sample location having the maximum results, the screening value used, and the number of samples that exceeded the screening criteria.

Inorganic Exceedances in Subsurface Soils

Parameter	Frequency of Detection	Maximum Result (mg/kg)	Sample with Maximum Detection	Minimum Regulatory Screening Values	
				Value (mg/kg)	Exceedances
ANTIMONY	1/22	0.643	NTC21SB-10-SO-0406	0.27	1
ARSENIC	22/22	85	NTC21SB-15-SO-0204	0.0013	22
BARIUM	22/22	157	NTC21SB-15-SO-0204	82	7
BERYLLIUM	22/22	4.05	NTC21SB-12-SO-0204	3.2	2
CADMIUM	20/22	9.62	NTC21SB-15-SO-0204	0.38	15
COBALT	22/22	23.8	NTC21SB-12-SO-0204	0.49	22
COPPER	22/22	124	NTC21SB-07-SO-0204	46	9
IRON	22/22	65,800	NTC21SB-15-SO-0204	640	22
LEAD	22/22	228	NTC21SB-07-SO-0204	14	20
MANGANESE	22/22	1,690	NTC21SB-09-SO-0204	57	22
MERCURY	21/22	0.484	NTC21SB-12-SO-0204	0.03	17
SELENIUM	1/22	1.31	NTC21SB-15-SO-0204	0.26	1
ZINC	22/22	1,010	NTC21SB-04-SO-0406	680	1

Antimony, selenium, and zinc were each detected in one sample at concentrations exceeding minimum regulatory screening values. Beryllium was detected in NTC21SB-15-SO-0204 and NTC21SB-12-SO-0204 at concentrations exceeding minimum regulatory screening values.

Arsenic, barium, cadmium, cobalt, copper, iron, lead, manganese, and mercury concentrations detected over minimum regulatory screening values were widespread throughout the site. However, most inorganics were detected at elevated concentrations at the following sample locations: NTC21-SB-04 (4 to 6 ft bgs) located in the northeast corner of the site, NTC21-SB-12 (2 to 4 ft bgs) located near the northeast corner of Building 1517, NTC21-SB-19 (2 to 4 ft bgs) located near the southwest corner of Building 1517, and NTC21-SB-15 (2 to 4 ft bgs) located near the northwest corner of Building 1517.

4.3.3 Groundwater Sampling Results

Illinois TACO, Illinois Non-TACO, and USEPA screening criteria that groundwater analytical results were compared to are shown in Table 4-9. Analytical results for groundwater samples collected at Site 21 are summarized in Tables 4-10 and 4-11. Groundwater sample locations are shown on Figure 3-5. Contaminants exceeding minimum regulatory screening values (primarily USEPA Tapwater) in groundwater are shown on Figure 4-16 and summarized below. Detailed groundwater analytical results are provided in Appendix F-3.

VOCs

The table below presents a summary of data for VOC contaminants that were detected at concentrations exceeding the minimum screening criteria. The data presented include: frequency of contaminant detection, maximum results, identity of the sample location having the maximum results, the screening value used, and the number of samples that exceeded the screening criteria.

VOC Exceedances in Groundwater

Parameter	Frequency of Detection	Maximum Result (ug/L)	Location of Maximum Detection	Minimum Regulatory Screening Values (1)	
				Value (ug/L)	Exceedances
BENZENE	1/6	0.96	NTC21-MW-01	0.41	1
TETRACHLOROETHENE	1/6	0.85	NTC21-MW-01	0.11	1

(1) USEPA Tapwater Criteria

Benzene and tetrachloroethene were detected in one groundwater sample collected from monitoring well NTC21-MW-01 at concentrations exceeding minimum regulatory screening values. Monitoring well NTC21-MW-01 is located in the northwest corner of the site, which is the former location of the incinerator.

SVOCs

The table below presents a summary of data for SVOC contaminants that were detected at concentrations exceeding the minimum regulatory screening values. The data presented include: frequency of contaminant detection, maximum results, identity of the sample location having the maximum results, the screening value used, and the number of samples that exceeded the screening criteria.

SVOC Exceedances in Groundwater

Parameter	Frequency of Detection	Maximum Result (ug/L)	Location of Maximum Detection	Minimum Regulatory Screening Values (1)	
				Value (ug/L)	Exceedances
BENZO(A)ANTHRACENE	2/6	0.05	NTC21-MW-03	0.029	2
BENZO(A)PYRENE	2/6	0.03	NTC21-MW-03 and NTC21-MW-05	0.0029	2
BENZO(B)FLUORANTHENE	2/6	0.03	NTC21-MW-03 and NTC21-MW-05	0.029	2
PENTACHLOROPHENOL	1/6	7.8	NTC21-MW-01	0.56	1

(1) USEPA Tapwater Criteria.

Concentrations of benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene that exceeded minimum screening criteria were detected in samples collected from monitoring wells NTC21-MW-03 and NTC21-MW-05. Monitoring well NTC21-MW-03 is located on the east side of the site and monitoring well NTC21-MW-05 is located directly south of Building 1517. Pentachlorophenol was detected at a concentration of 7.8 J ug/L, which exceeds the minimum regulatory screening value of 0.56 ug/L, in monitoring well NTC21-MW-01. Monitoring well NTC21-MW-01 is located in the northwest corner of the site, which is the former location of the incinerator.

Pesticides/PCBs

The table below presents a summary of data for pesticide/PCB contaminants that were detected at concentrations exceeding the minimum regulatory screening values. The data presented include: frequency of contaminant detection, maximum results, identity of the sample location having the maximum results, the screening value used, and the number of samples that exceeded the screening criteria.

Pesticide/PCB Exceedances in Groundwater

Parameter	Frequency of Detection	Maximum Result (ug/L)	Location of Maximum Detection	Minimum Regulatory Screening Values (1)	
				Value (ug/L)	Exceedances
DELTA-BHC	2/6	0.02	NTC21-MW-06	0.011	1

(1) USEPA Tapwater Criteria

Delta-BHC exceeded minimum regulatory screening criteria in NTC21-MW-06, located in the southwest corner of the site near Building 1505.

Herbicides

2,4,5-TP (silvex), 2,4-DB, dalapon, and dichloroprop were detected at concentrations exceeding reporting limits. However, concentrations of these contaminants were below the minimum regulatory screening values.

Dioxins/Furans

Dioxins/furans were not detected at concentrations exceeding reporting limits in groundwater.

Inorganics

The table below presents a summary of data for inorganic contaminants that were detected at concentrations exceeding the minimum regulatory screening values. The data presented include: frequency of contaminant detection, maximum results, identity of the sample location having the maximum results, the screening value used, and the number of samples that exceeded the screening criteria.

Inorganic Exceedances in Groundwater

Parameter	Frequency of Detection	Maximum Result (µg/L)	Location of Maximum Detection	Minimum Regulatory Screening Values (1)	
				Value (µg/L)	Exceedances
ARSENIC	5/6	7.26	NTC21-MW-02	0.045	5
COBALT	3/6	15.3	NTC21-MW-02	11	1
IRON	6/6	34,000	NTC21-MW-02	5,000	1
MANGANESE	6/6	5,400	NTC21-MW-05	150	4

(1) USEPA Tapwater Criteria

Concentrations of inorganics (arsenic, cadmium, cobalt, iron, and manganese) exceeding minimum regulatory screening values were widespread throughout the site. However, higher inorganic concentrations were detected in samples collected from NTC21-MW-02 and NTC21-MW-05. Monitoring well NTC21-MW-02 is located north of Building 7801, and NTC21-MW-05 is located directly south of Building 1517.

4.4 SOIL AND GROUNDWATER RESULTS COMPARISON TO TACO INGESTION AND INHALATION REMEDIATION OBJECTIVES (RESIDENTIAL AND INDUSTRIAL)

4.4.1 Surface Soil Results Comparison

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)flouranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene, were detected at concentrations above TACO Ingestion Remediation Objectives (Residential and/or Industrial). The highest concentrations of these constituents were encountered at one sampling point, NTC21-SB-21, where they exceeded 12 times the average concentration. Manganese and lead were detected at concentrations above TACO Ingestion Remediation Objectives (Residential only). These exceedances in surface soil are shown on Figure 4-17.

Benzo(a)anthracene

The following table presents benzo(a)anthracene concentrations detected at Site 21 that exceed TACO Ingestion Residential (900 ug/kg) and/or Industrial (8,000 ug/kg) Soil Remediation Objectives:

Sample Location	Depth (ft bgs)	Result (ug/kg)	Description of Sample Location
NTC21-SB-01	1 to 2	4,800	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-03	0 to 1	1,100	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-07	0 to 1	4,200	Located in the northeast corner of the site.
NTC21-SB-11	0 to 1	1,600	Located on the southeast corner of Building 1517.
NTC21-SB-21	0 to 1	22,000	Located directly south of Building 1517.

Benzo(a)pyrene

The following table presents benzo(a)pyrene concentrations detected at Site 21 that exceed TACO Ingestion Residential (90 ug/kg) and/or Industrial (800 ug/kg) Soil Remediation Objectives.

Sample Location	Depth (ft bgs)	Result (ug/kg)	Description of Sample Location
NTC21-SB-01	1 to 2	4,200	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-02	0 to 1	360	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-03	0 to 1	2,400	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-05	0 to 1	390	Located on the east side of the site.
NTC21-SB-07	0 to 1	3,200	Located in the northeast corner of the site.
NTC21-SB-08	0 to 1	830	Located in the southeast corner of the site.
NTC21-SB-09	0 to 1	460	Located near the northeast corner of Building 1518.
NTC21-SB-10	0 to 1	690	Located in the southeast corner of the site.
NTC21-SB-11	0 to 1	2,900	Located in the southeast corner of Building 1517.
NTC21-SB-12	0 to 1	430	Located in the northeast corner of Building 1517.
NTC21-SB-14	0 to 1	860	Located directly north of Building 1517.
NTC21-SB-17	0 to 1	600	Located slightly north of Building 1516.
NTC21-SB-18	0 to 1	200	Located in the southwest corner of the site.
NTC21-SB-19	0 to 1	250	Located in the southwest corner of Building 1517.
NTC21-SB-20	0 to 1	560	Located slightly southwest of Building 1517.
NTC21-SB-21	0 to 1	38,000	Located slightly south of Building 1517.
NTC21-SB-22	0 to 1	340	Located slightly south of Building 1517.

Benzo(b)flouranthene

The following table presents benzo(b)flouranthene concentrations detected at Site 21 that exceed TACO Ingestion Residential (900 ug/kg) and/or Industrial (8,000 ug/kg) Soil Remediation Objectives.

Sample Location	Depth (ft bgs)	Result (ug/kg)	Description of Sample Location
NTC21-SB-01	1 to 2	6,600	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-03	0 to 1	3,500	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-07	0 to 1	3,200	Located in the northeast corner of the site.
NTC21-SB-08	0 to 1	830	Located in the southeast corner of the site.
NTC21-SB-10	0 to 1	970	Located in the southeast corner of the site.
NTC21-SB-11	0 to 1	4,100	Located on the southeast corner of Building 1517.
NTC21-SB-17	0 to 1	940	Located slightly north of Building1516.
NTC21-SB-21	0 to 1	59,000	Located slightly south of Building 1517.

Benzo(k)fluoranthene

Benzo(k)fluoranthene was detected at a concentration of 21,000 ug/kg (estimated) in soil sample NTC21-SB21-SO-0001, located slightly south of Building 1517. This concentration exceeded the TACO Residential Ingestion Soil Remediation Objective value of 9,000 ug/kg.

Dibenzo(a,h)anthracene

The following table presents dibenzo(a,h)anthracene concentrations detected at Site 21 that exceed TACO Ingestion Residential (90 ug/kg) and/or Industrial (800 ug/kg) Soil Remediation Objectives.

Sample Location	Depth (ft bgs)	Result (ug/kg)	Description of Sample Location
NTC21-SB-01	1 to 2	1,100	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-03	0 to 1	900	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-08	0 to 1	140	Located in the southeast corner of the site.
NTC21-SB-10	0 to 1	150	Located in the southeast corner of the site.
NTC21-SB-11	0 to 1	470	Located on the southeast corner of Building 1517.
NTC21-SB-17	0 to 1	100	Located slightly north of Building1516.
NTC21-SB-21	0 to 1	690	Located slightly south of Building 1517.

Indeno(1,2,3-cd)pyrene

The following table presents indeno(1,2,3-cd)pyrene concentrations detected at Site 21 that exceed TACO Residential Ingestion (900 ug/kg) and/or Industrial (8,000 ug/kg) Soil Remediation Objectives.

Sample Location	Depth (ft bgs)	Result (mg/kg)	Description of Sample Location
NTC21-SB-03	2 to 4	16,000	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-07	2 to 4	2,500	Located in the northeast corner of the site.

Lead

The following table presents lead concentrations detected at Site 21 that exceed TACO Residential Ingestion (400 mg/kg) Soil Remediation Objectives.

Sample Location	Depth (ft bgs)	Result (mg/kg)	Description of Sample Location
NTC21-SB-10	0 to 1	428	Located in the southeast corner of the site.
NTC21-SB-13	0 to 1	407	Located near the northeast corner of Building 1517.

Manganese

Manganese was detected at a concentration of 2,420 J mg/kg in soil sample NTC21SB-14-SO-0001, located directly north of Building 1517. This concentration exceeded the TACO Residential Ingestion Soil Remediation Objective value of 1,600 mg/kg.

4.4.2 Subsurface Soil Results Comparison

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)flouranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene, were detected at concentrations above TACO Ingestion Remediation Objectives (Residential and/or Industrial). The highest concentrations of these constituents were encountered at one sampling point, NTC21-SB-03, where they exceeded 16 times the average concentration. Manganese was detected at concentrations above TACO Ingestion Remediation Objectives (Residential only). These exceedances in subsurface soil are shown on Figure 4-17.

Benzo(a)anthracene

The following table presents benzo(a)anthracene concentrations detected at Site 21 that exceed TACO Ingestion Residential (900 ug/kg) and/or Industrial (8,000 ug/kg) Soil Remediation Objectives:

Sample Location	Depth (ft bgs)	Result (ug/kg)	Description of Sample Location
NTC21-SB-02	4 to 6	2,000	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-03	2 to 4	32,000	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-07	2 to 4	4,300	Located in the northeast corner of the site.

Benzo(a)pyrene

The following table presents benzo(a)pyrene concentrations detected at Site 21 that exceed TACO Ingestion Residential (90 ug/kg) and/or Industrial (800 ug/kg) Soil Remediation Objectives.

Sample Location	Depth (ft bgs)	Result (ug/kg)	Description of Sample Location
NTC21-SB-02	2 to 4	320	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-02	4 to 6	1,200	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-03	2 to 4	27,000	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-05	2 to 4	210	Located on the east side of the site.
NTC21-SB-06	2 to 4	520	Located on the east side of the site.
NTC21-SB-07	2 to 4	3,600	Located in the northeast corner of the site.
NTC21-SB-08	2 to 4	740	Located in the southeast corner of the site.
NTC21-SB-09	2 to 4	170	Located near the northeast corner of Building 1518.
NTC21-SB-11	2 to 4	220	Located on the southeast corner of Building 1517.
NTC21-SB-12	2 to 4	620	Located in the northeast corner of Building 1517.
NTC21-SB-22	2 to 4	480	Located slightly south of Building 1517.

Benzo(b)flouranthene

The following table presents benzo(b)flouranthene concentrations detected at Site 21 that exceed TACO Ingestion Residential (900 ug/kg) and/or Industrial (8,000 ug/kg) Soil Remediation Objectives.

Sample Location	Depth (ft bgs)	Result (ug/kg)	Description of Sample Location
NTC21-SB-02	4 to 6	1,600	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-03	2 to 4	41,000	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-07	2 to 4	4,300	Located in the northeast corner of the site.
NTC21-SB-08	2 to 4	1,200	Located in the southeast corner of the site.
NTC21-SB-12	2 to 4	1,200 J	Located in the northeast corner of Building 1517.

Benzo(k)fluoranthene

Benzo(k)fluoranthene was detected at a concentration of 14,000 ug/kg in soil sample NTC21SB-03-SO-0204, located in the northwest corner of the site, which is the former location of the incinerator. This concentration exceeded the TACO Residential Ingestion Soil Remediation Objective value of 9,000 ug/kg.

Dibenzo(a,h)anthracene

The following table presents dibenzo(a,h)anthracene concentrations detected at Site 21 that exceed TACO Ingestion Residential (90 ug/kg) and/or Industrial (800 ug/kg) Soil Remediation Objectives.

Sample Location	Depth (ft bgs)	Result (ug/kg)	Description of Sample Location
NTC21-SB-02	4 to 6	240	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-03	2 to 4	3,300	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-08	2 to 4	160	Located in the southeast corner of the site.
NTC21-SB-12	2 to 4	100	Located in the northeast corner of Building 1517.

Indeno(1,2,3-cd)pyrene

The following table presents indeno(1,2,3-cd)pyrene concentrations detected at Site 21 that exceed TACO Ingestion Residential (900 ug/kg) and/or Industrial (8,000 ug/kg) Soil Remediation Objectives:

Sample Location	Depth (ft bgs)	Result (ug/kg)	Description of Sample Location
NTC21-SB-03	2 to 4	16,000	Located in the northwest corner of the site, which is the former location of the incinerator.
NTC21-SB-07	2 to 4	2,500	Located in the northeast corner of the site.

Manganese

Manganese was detected at a concentration of 1,690 J mg/kg in soil sample NTC21SB09-SO-0204, located southeast of Building 1517. This concentration exceeded the TACO Residential Ingestion Soil Remediation Objective value of 1,600 mg/kg.

4.4.3 Groundwater Results Comparison

Pentachlorophenol, iron, and manganese were detected at concentrations above TACO Class I Groundwater criteria. These exceedances in groundwater are shown on Figure 4-18.

Pentachlorophenol

Pentachlorophenol was detected in one sample collected from NTC21-MW-01 at a concentration [7.8 (estimated) ug/L] exceeding TACO Class I Groundwater criteria (1.0 ug/L). Monitoring well NTC21-MW-01 is located in the northwest corner of the site, which is the former location of the incinerator.

Iron

Iron was detected in one sample collected from NTC21-MW-02 at a concentration (34,000 ug/L) exceeding TACO Class I Groundwater criteria (5,000 ug/L). Monitoring well NTC21-MW-02 is located north of Building 7801.

Manganese

The following table presents manganese concentrations detected at Site 21 that exceed TACO Class I Groundwater criteria (150 ug/L).

Sample Location	Result (ug/L)	Description of Sample Location
NTC21-MW-02	3,040	Located slightly north of Building 7801
NTC21-MW-03	2,150	Located on the east side of the site.
NTC21-MW-04	168	Located in the southeast corner of the site.
NTC21-MW-05	5,400	Located directly south of Building 1517.

4.5 BUILDING 1600A UST CLOSURE DATA

As discussed in Section 2.4, data were collected from sampling points located in the northwest corner of Site 21 that were installed as part of the closure of Building 1600A USTs. The sampling points situated in the northwest portion of Site 21 included two groundwater monitoring wells and three soil borings. Samples of groundwater and soil were collected and analyzed for concentrations of the following parameters: VOCs, which included benzene, ethylbenzene, m,p-xylene, methyl cyclohexane, o-xylene, toluene, and total xylenes; and SVOCs which included acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene. For the closure assessment, groundwater data from the wells were compared against GROs for Class I Groundwater as supplied by 35 IAC Part 742. Soil data were compared against the lowest, or most conservative SROs for Residential Properties as supplied in 35 IAC Part 742, while taking into account the background values as provided in Table H of Appendix A of Illinois EPA TACO regulations.

Groundwater samples from both wells had concentrations that were less than the GROs and were generally less than the testing procedure detection limits. As indicated in the Building 1600A report, only one soil sample had detections of organic compounds which exceeded the SROs. This was the sample from soil boring SB10. The five compounds in exceedance were: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and Indeno(1,2,3-c,d)pyrene. SB10 was located approximately 95 feet east of soil boring NTC21-SB-01, which was installed as part of the Site 21 investigation. Samples from the two borings have similar levels of organic compounds.

No documentation could be found which confirmed that the data in the Building 1600A UST Closure Report were validated; therefore, they will not be used in this report other than for reference. Since NTC21-SB-01 is similar in both chemical results and location, it is believed to be representative of the conditions encountered in that portion of the site.

4.6 SUMMARY

The initial comparison of the soil results to the minimum regulatory screening criteria (Section 4.3) identified many exceedances. The minimum regulatory screening criteria in many cases are the "soil to groundwater" criteria provided by TACO or EPA. However, when the soil results are compared to the TACO Residential and Industrial Ingestion and Inhalation screening criteria, there are only a handful of exceedances as described in Sections 4.4.1 and 4.4.2 and shown on Figure 4-17.

The comparison of the groundwater results in Section 4.4.3 identified a handful of exceedances in the surficial aquifer. The majority of chemicals detected in the subsurface soil at concentrations exceeding the "soil to groundwater" criteria were not detected in groundwater samples at the site. Naval Station Great Lakes and the communities surrounding the base use a public water supply that obtains water from Lake Michigan. Naval Station Great Lakes also has an ordinance that does not allow the use of groundwater, and a Memorandum of Agreement with Illinois EPA that restricts the use of groundwater. The silt and pebbly clay in the surficial aquifer has insufficient permeability to allow free groundwater movement, and therefore is not considered to be a favorable source of groundwater (Illinois State Geological Survey, 1950).

TABLE 4-1

SUMMARY OF SIEVE ANALYSIS RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Fraction	NTC21SB08-SO-0204	NTC09SB07-SO-1416	NTC09SB09-SO-1012	NTC09SB21-SO-0608
CLAY (%)	11	6	20	25
GRAVEL (%)	39	0	7	1
SAND (%)	29	45	37	11
SILT (%)	21	49	36	63
SIEVE 1" (% passing)	100	100	100	100
SIEVE 3/4" (% passing)	93	100	100	100
SIEVE 1/2" (% passing)	81	100	100	100
NO. 4 SIEVE (% passing)	61	100	93	99
NO. 10 SIEVE (% passing)	51	100	85	97
NO. 40 SIEVE (% passing)	43	85	72	95
NO. 100 SIEVE (% passing)	36	71	61	91
NO. 200 SIEVE (% passing)	32	55	56	88
Hydrometer - 0.026 mm (% passing)	22	26	48	60
Hydrometer - 0.01 mm (% passing)	15	14	31	41
Hydrometer - 0.007 mm (% passing)	12	10	26	33
Hydrometer - 0.00052 mm (% passing)	11	6	20	25
Hydrometer - 0.004 mm (% passing)	10	6	19	23
Hydrometer - 0.002 mm (% passing)	6	6	14	18
USCS SYMBOL	SP/SM	SM	SM/SC	ML/CL

TABLE 4-2

WATER LEVEL MEASUREMENTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Well ID	Ground Surface Elevation (feet above msl)	Top of Casing (feet above msl)	Bottom of Well (feet bgs)	Screened Interval		11/17/2009	
				Top (feet bgs)	Bottom (feet bgs)	Depth to Water (feet)	Water Level (feet above msl)
NTC21-MW-01	660.630	660.365	14.00	4.00	14.00	5.01	655.355
NTC21-MW-02	654.245	653.660	16.00	6.00	16.00	2.42	651.240
NTC21-MW-03	653.315	652.825	14.00	4.00	14.00	1.35	651.475
NTC21-MW-04	653.105	652.740	20.00	10.00	20.00	3.45	649.290
NTC21-MW-05	655.280	655.030	13.00	3.00	13.00	2.98	652.050
NTC21-MW-06	659.530	659.170	14.00	4.00	14.00	6.25	652.920

Wells were surveyed by a professional surveyor (James Anderson Company) using NAVD 88 US in feet.

TABLE 4-3

SLUG TEST RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Monitoring Well	Northing	Easting	Elevation Top of PVC (feet above msl)	Existing Ground Elevation (feet above msl)	Total Depth	Screen Depth	Screen Elevation	Sandpack Depth	Sandpack Elevation	Hydraulic Conductivity (ft/sec)	Hydraulic Conductivity (cm/sec)
NTC21-MW-01	2057880.83	1114691.88	660.37	660.63	14.00	4.00 - 14.00	656.37 - 646.37	3.00 - 14.00	657.37 - 646.37	5.7×10^{-3}	1.73×10^{-2}
NTC21-MW-02	2057873.49	1115236.52	653.66	654.25	16.00	6.00 - 16.00	647.66 - 637.66	5.00 - 16.00	648.66 - 637.66	1.06×10^{-5}	3.23×10^{-4}
NTC21-MW-03	2057733.70	1115391.71	652.83	653.32	14.00	4.00 - 14.00	648.83 - 638.83	3.00 - 14.00	649.83 - 638.83	Not Tested	Not Tested
NTC21-MW-04	2057444.47	1115416.45	652.74	653.11	13.00	10.00 - 20.00	642.74 - 632.74	8.00 - 20.00	644.74 - 632.74	Not Tested	Not Tested
NTC21-MW-05	2057518.81	1115138.92	655.03	655.28	16.00	6.00 - 16.00	649.03 - 639.03	2.00 - 14.00	653.03 - 641.03	2.87×10^{-5}	8.75×10^{-4}
NTC21-MW-06	2057503.81	1114703.35	659.17	659.53	14.00	4.00 - 14.00	655.17 - 645.17	3.00 - 14.00	656.17 - 645.17	3.08×10^{-4}	9.4×10^{-3}

1. Rising head slug tests completed in selected wells were analyzed by Bouwer and Rice Method (1989).
2. Elevations were obtained by James Anderson Company.
3. Northing and Easting Coordinates according to North American Datum 83.
4. Vertical Elevations according to North American Vertical Datum 88.

SURFACE AND SUBSURFACE SOIL REGULATORY SCREENING VALUES
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	Illinois EPA										USEPA				
	Non-TACO Class 1 Soil to Groundwater	Non-TACO Ingestion Soil Remediation Objectives (Industrial)	Non-TACO Inhalation Soil Remediation Objectives (Industrial)	Non-TACO Ingestion Soil Remediation Objectives (Residential)	Non-TACO Inhalation Soil Remediation Objectives (Residential)	TACO Class 1 Soil to Groundwater	TACO Ingestion Soil Remediation Objectives (Industrial)	TACO Inhalation Soil Remediation Objectives (Industrial)	TACO Ingestion Soil Remediation Objectives (Residential)	TACO Inhalation Soil Remediation Objectives (Residential)	USEPA ORNL MCL-Based SSLs	USEPA Residential SSLs	USEPA ORNL Risk-Based SSLs	USEPA Industrial Inhalation SSLs	USEPA Residential Inhalations SSLs
Volatile Organics (ug/kg)															
2-BUTANONE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	28000000	1500	24000000	24000000
ACETONE	NC	NC	NC	NC	NC	25000	NC	100000000	70000000	100000000	NC	61000000	4500	NC	NC
BENZENE	NC	NC	NC	NC	NC	30	100000	1600	12000	800	2.6	1100	0.21	1600	830
CARBON DISULFIDE	NC	NC	NC	NC	NC	32000	200000000	720000	7800000	720000	NC	820000	310	720000	720000
CHLOROMETHANE	NC	180000	NC	110000	NC	NC	NC	NC	NC	NC	120000	49	3900	2100	2.10E+03
CIS-1,2-DICHLOROETHENE	NC	NC	NC	NC	400	20000000	1200000	780000	1200000	21	780000	110	NC	NC	NC
CYCLOHEXANE	NC	NC	280000	NC	280000	NC	NC	NC	NC	NC	NC	7000000	13000	1.32E+13	8.51E+12
ETHYLBENZENE	NC	NC	NC	NC	NC	13000	200000000	400000	7800000	400000	780	5400	1.7	400000	400000
ISOPROPYLBENZENE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	2100000	1100	850000	850000
METHYL CYCLOHEXANE	NC	NC	120000	NC	120000	NC	NC	NC	NC	NC	NC	NC	NC	490000	490000
TETRACHLOROETHENE	NC	NC	NC	NC	NC	60	110000	20000	12000	11000	2.3	550	0.049	20000	10000
TOLUENE	NC	NC	NC	NC	NC	12000	410000000	650000	16000000	650000	690	5000000	1600	650000	650000
TRICHLOROFLUOROMETHANE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	790000	830	1600000	1100000
TOTAL XYLENES	NC	NC	NC	NC	NC	150000	410000000	320000	16000000	320000	9800	630000	200	1100000	700000
Semivolatile Organics (ug/kg)															
1,1-BIPHENYL	150000	100000000	NC	3900000	NC	NC	NC	NC	NC	NC	NC	3900000	19000	NC	NC
2-METHYLNAPHTHALENE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	310000	750	NC	NC
4-METHYLPHENOL	200	10000000	NC	390000	NC	NC	NC	NC	NC	NC	NC	310000	150	NC	NC
ACENAPHTHENE	NC	NC	NC	NC	NC	570000	120000000	NC	4700000	NC	NC	3400000	22000	NC	NC
ACENAPHTHYLENE	85000	61000000	NC	2300000	NC	NC	NC	NC	NC	NC	NC	3400000	22000	NC	NC
ACETOPHENONE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	7800000	1100	NC	NC
ANTHRACENE	NC	NC	NC	NC	NC	12000000	610000000	NC	23000000	NC	NC	17000000	360000	NC	NC
BENZO(A)ANTHRACENE	NC	NC	NC	NC	NC	2000	8000	NC	900	NC	NC	150	10	NC	NC
BENZO(A)PYRENE	NC	NC	NC	NC	NC	8000	800	NC	90	NC	240	15	3.5	NC	NC
BENZO(B)FLUORANTHENE	NC	NC	NC	NC	NC	5000	8000	NC	900	NC	NC	150	35	NC	NC
BENZO(G,H,I)PERYLENE	27000000	61000000	NC	2300000	NC	NC	NC	NC	NC	NC	NC	1700000	120000	NC	NC
BENZO(K)FLUORANTHENE	NC	NC	NC	NC	NC	49000	78000	NC	9000	NC	NC	1500	350	NC	NC
BIS(2-ETHYLHEXYL)PHTHALAT	NC	NC	NC	NC	NC	3600000	410000	31000000	46000	31000000	1400	35000	1100	NC	NC
BUTYL BENZYL PHTHALATE	NC	NC	NC	NC	NC	930000	410000000	930000	16000000	930000	NC	260000	510	NC	NC
CARBAZOLE	NC	NC	NC	NC	NC	600	290000	NC	32000	NC	NC	NC	NC	NC	NC
CHRYSENE	NC	NC	NC	NC	NC	160000	780000	NC	88000	NC	NC	15000	1100	NC	NC
DI-N-BUTYL PHTHALATE	NC	NC	NC	NC	NC	2300000	200000000	2300000	7800000	2300000	NC	6100000	9200	NC	NC
DIBENZO(A,H)ANTHRACENE	NC	NC	NC	NC	NC	2000	800	NC	90	NC	NC	15	11	NC	NC
DIBENZOFURAN	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	78000	680	NC	NC
FLUORANTHENE	NC	NC	NC	NC	NC	4300000	82000000	NC	3100000	NC	NC	2300000	160000	NC	NC
FLUORENE	NC	NC	NC	NC	NC	560000	82000000	NC	3100000	NC	NC	2300000	27000	NC	NC
INDENO(1,2,3-CD)PYRENE	NC	NC	NC	NC	NC	14000	8000	NC	900	NC	NC	150	120	NC	NC
NAPHTHALENE	NC	NC	NC	NC	NC	12000	41000000	270000	1600000	170000	NC	3600	0.47	270000	170000
PHENANTHRENE	200000	61000000	NC	2300000	NC	NC	NC	NC	NC	NC	NC	1700000	120000	NC	NC
PYRENE	NC	NC	NC	NC	NC	4200000	61000000	NC	2300000	NC	NC	1700000	120000	NC	NC
Pesticides/PCBs (ug/kg)															
4,4'-DDD	NC	NC	NC	NC	NC	16000	24000	NC	3000	NC	NC	2000	66	NC	NC
4,4'-DDE	NC	NC	NC	NC	NC	54000	17000	NC	2000	NC	NC	1400	47	NC	NC
4,4'-DDT	NC	NC	NC	NC	NC	32000	17000	1500000	2000	NC	NC	1700	67	1400000	750000
ALDRIN	NC	NC	NC	NC	NC	500	300	6600	40	3000	NC	29	0.65	6300	3400
ALPHA-BHC	NC	NC	NC	NC	NC	0.5	900	1500	100	800	NC	77	0.062	1400	750
ALPHA-CHLORDANE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	140	1600	13	NC	72000
AROCLOR-1242	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	220	5.3	NC	NC
AROCLOR-1260	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	220	24	NC	NC
BETA-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	270	0.22	11000	6000
DELTA-BHC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	77	0.062	NC	NC
DIELDRIN	NC	NC	NC	NC	NC	4	400	2200	40	1000	NC	30	0.17	2100	1100
ENDOSULFAN I	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	370000	3000	NC	NC
ENDOSULFAN II	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	370000	3000	NC	NC
ENDOSULFAN SULFATE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	370000	3000	NC	NC
ENDRIN	NC	NC	NC	NC	NC	1000	610000	NC	23000	NC	81	18000	440	NC	NC
ENDRIN ALDEHYDE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	81	18000	440	NC	NC
ENDRIN KETONE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	81	18000	440	NC	NC
GAMMA-BHC (LINDANE)	NC	NC	NC	NC	NC	9	4000	NC	500	NC	1.2	520	0.36	NC	NC
GAMMA-CHLORDANE	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	140	1600	13	120000	72000
HEPTACHLOR EPOXIDE	NC	NC	NC	NC	NC	700	600	9200	70	5000	4.1	53	0.15	8800	4700
METHOXYCHLOR	NC	NC	NC	NC	NC	160000	10000000	NC	390000	NC	2200	310000	9900	NC	NC
Herbicides (ug/kg)															
2,4-D	NC	NC	NC	NC	NC	1500	20000000	NC	780000	NC	18	690000	95	NC	NC
DICAMBA	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1800000	280	NC	NC
DINOSEB	NC	NC	NC	NC	NC	340	2000000	NC	78000	NC	62	61000	320	NC	NC
Dioxins/Furans (ng/kg)															
1,2,3,4,6,7,8,9-OCDD	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	15000	870	NC	NC
1,2,3,4,6,7,8,9-OCDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	15000	870	NC	NC
1,2,3,4,6,7,8-HPCDD	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	450	26	NC	NC
1,2,3,4,6,7,8-HPCDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	450	26	NC	NC
1,2,3,4,7,8,9-HPCDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	450	26	NC	NC
1,2,3,4,7,8-HXCDD	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	45	2.6	NC	NC
1,2,3,4,7,8-HXCDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	45	2.6	NC	NC
1,2,3,6,7,8-HXCDD	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	45	2.6	NC	NC
1,2,3,6,7,8-HXCDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	45	2.6	NC	NC
1,2,3,7,8,9-HXCDD	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	45	2.6	4750000	2540000
1,2,3,7,8,9-HXCDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	45	2.6	NC	NC
1,2,3,7,8-PECDD	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	4.5	0.26	NC	NC
1,2,3,7,8-PECDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	150	8.7	NC	NC
2,3,4,6,7,8-HXCDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	45	2.6	NC	NC
2,3,4,7,8-PECDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	15	0.87	NC	NC
2,3,7,8-TCDD	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	15	4.5	0.26	79	42
2,3,7,8-TCDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	45	2.6	NC	NC
Inorganics (mg/kg)															
ALUMINUM	NC	1000000	1000000	78000	1000000	NC	NC	NC	NC	NC	NC	77000	55000	11000000	7090000
ANTIMONY	NC	NC	NC	NC	NC	5	820	NC	31	NC	0.27	31	0.66	NC	NC
ARSENIC	NC	NC	NC	NC	NC	31	NC	1200	NC	750	0.29	0.39	0.0013	1440	769
BARIUM	NC	NC	NC	NC	NC	2100	140000	910000	5500	690000	82	15000	300	1100000	709000
BERYLLIUM	NC	NC	NC	NC	NC	8000	4100	2100	160	1300	3.2	160	58	2570	1380
CADMIUM	NC	NC	NC	NC	NC	430	2000	2800	78	1800	0.38	70	1.4	3430	1840
CALCIUM	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
CHROMIUM	NC	NC	NC	NC	NC	28	6100	420	230	270	180000	NC	NC	515	276
COBALT	NC	NC	NC	NC	NC	NC	120000	NC	4700	NC	NC	23	0.49	2210	1180
COPPER	NC	NC	NC	NC	NC	330000	82000	NC	2900	NC	46	3100	51	NC	NC
IRON	NC	1000000	NC	55000	NC	NC	NC	NC	NC	NC	NC	55000	640	NC	NC
LEAD	NC	NC	NC	NC	NC	107	800	NC	400	NC	14	400	NC	NC	NC
MAGNESIUM	NC	NC	NC	NC	NC	NC	NC	NC	325000	NC	NC	NC	NC	NC	NC
MANGANESE	NC	NC	NC	NC	NC	NC	41000	91000	1600	69000	NC	1800	57	110000	70900
MERCURY	NC	NC	NC	NC	NC	NC	610	16	23	10	0.1	5.6	0.03	2.9	2.9
NICKEL	NC	NC	NC	NC	NC	8	41000	21000	1600	13000	NC	1500	48	NC	NC
POTASSIUM	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
SELENIUM	NC	NC	NC	NC	NC	2.4	10000	NC	390	NC	0.26	390	0.95	NC	NC
SILVER	NC	NC	NC	NC	NC	110	10000	NC	390	NC	NC	390	1.6	NC	NC
SODIUM	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
VANADIUM	NC	NC	NC	NC	NC	980	14000	NC	550	NC	NC	390	180	NC	NC
ZINC	NC	NC	NC	NC	NC	53000	610000	NC	23000	NC	NC	23000	680	NC	NC

ng/kg = Nanogram per kilogram.
ug/kg = Microgram per kilogram.
mg/kg = Milligram per kilogram.

NC = No criteria.

TABLE 4-5

OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN SURFACE SOIL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS
PAGE 1 OF 2

Parameter	Frequency of Detection	Minimum Result	Maximum Result	Sample with Maximum Detection	Minimum Non-Detection	Maximum Non-Detection	Average Positive Result	Overall Average	Standard Deviation	Minimum Regulatory Screening Value		Minimum Non-TACO Screening Value			Minimum TACO Screening Value			Minimum USEPA Screening Value		
										Value	Exceedances	Value	Exceedances	Source	Value	Exceedances	Source	Value	Exceedances	Source
Volatile Organics (ug/kg)																				
2-BUTANONE	1/22	30 J	30 J	NTC21-SB-05-SO-0001	4.3	7.8	3.00E+01	3.95E+00	5.84E+00	1500	0	NC	0	1 through 5	NC	0	6 through 10	1500	0	13
ACETONE	6/22	21	180 J	NTC21-SB-05-SO-0001	4.3	14	7.58E+01	2.28E+01	4.58E+01	4500	0	NC	0	1 through 5	25000	0	6	4500	0	13
BENZENE	5/22	0.56 J	1.1 J	NTC21-SB-01-SO-0102	4.3	7.8	7.70E-01	2.34E+00	9.78E-01	0.21	5	NC	0	1 through 5	30	0	6	0.21	5	13
CARBON DISULFIDE	14/22	1.6 J	16	NTC21-SB-17-SO-0001	4.4	6.6	4.91E+00	4.13E+00	3.09E+00	310	0	NC	0	1 through 5	32000	0	6	310	0	13
CYCLOHEXANE	12/22	0.71 J	2.9 J	NTC21-SB-10-SO-0001	4.3	7.8	1.36E+00	2.04E+00	9.79E-01	13000	0	280000	0	3 and 5	NC	0	6 through 10	13000	0	13
ETHYLBENZENE	1/22	0.9 J	0.9 J	NTC21-SB-11-SO-0001	4.3	7.8	9.00E-01	2.67E+00	6.20E-01	1.7	0	NC	0	1 through 5	13000	0	6	1.7	0	13
METHYL CYCLOHEXANE	18/22	0.43 J	3.7 J	NTC21-SB-12-SO-0001	4.3	6.6	1.77E+00	1.92E+00	1.03E+00	120000	0	120000	0	3 and 5	NC	0	6 through 10	490000	0	14 and 15
TETRACHLOROETHENE	1/22	1.4 J	1.4 J	NTC21-SB-19-SO-0001	4.3	7.8	1.40E+00	2.70E+00	5.50E-01	0.049	1	NC	0	1 through 5	60	0	6	0.049	1	13
TOLUENE	2/22	1.1 J	1.4 J	NTC21-SB-01-SO-0102	4.3	7.8	1.25E+00	2.66E+00	6.37E-01	690	0	NC	0	1 through 5	12000	0	6	690	0	11
TOTAL XYLENES	1/22	1.6 J	1.6 J	NTC21-SB-11-SO-0001	4.3	7.8	1.60E+00	2.70E+00	5.37E-01	200	0	NC	0	1 through 5	150000	0	6	200	0	13
Semivolatile Organics (ug/kg)																				
1,1-BIPHENYL	1/22	62 J	62 J	NTC21-SB-01-SO-0102	350	430	6.20E+01	1.83E+02	2.93E+01	19000	0	150000	0	1	NC	0	6 through 10	19000	0	13
2-METHYLNAPHTHALENE	22/22	27	900	NTC21-SB-14-SO-0001	---	---	4.16E+02	4.16E+02	2.59E+02	750	3	NC	0	1 through 5	NC	0	6 through 10	750	3	13
4-METHYLPHENOL	1/21	50 J	50 J	NTC21-SB-21-SO-0001	350	430	5.00E+01	1.84E+02	3.26E+01	150	0	200	0	1	NC	0	6 through 10	150	0	13
ACENAPHTHENE	17/22	13	2200	NTC21-SB-21-SO-0001	3.7	4.3	3.04E+02	2.36E+02	5.03E+02	22000	0	NC	0	1 through 5	570000	0	6	22000	0	13
ACENAPHTHYLENE	10/22	20	680	NTC21-SB-03-SO-0001	3.5	4.3	1.25E+02	5.78E+01	1.44E+02	22000	0	85000	0	1	NC	0	6 through 10	22000	0	13
ACETOPHENONE	1/22	48 J	48 J	NTC21-SB-08-SO-0001	350	430	4.80E+01	1.83E+02	3.23E+01	1100	0	NC	0	1 through 5	NC	0	6 through 10	1100	0	13
ANTHRACENE	14/22	37	7200	NTC21-SB-21-SO-0001	3.6	4.3	9.18E+02	5.85E+02	1.56E+03	360000	0	NC	0	1 through 5	12000000	0	6	360000	0	13
BENZO(A)ANTHRACENE	20/22	110	22000 J	NTC21-SB-21-SO-0001	4	4.3	1.89E+03	1.72E+03	4.70E+03	10	20	NC	0	1 through 5	900	5	9	10	20	13
BENZO(A)PYRENE	17/22	200	38000 J	NTC21-SB-21-SO-0001	3.6	4.3	3.33E+03	2.58E+03	8.00E+03	3.5	17	NC	0	1 through 5	90	17	9	3.5	17	13
BENZO(B)FLUORANTHENE	20/22	290	59000 J	NTC21-SB-21-SO-0001	4.1	4.3	4.38E+03	3.98E+03	1.24E+04	35	20	NC	0	1 through 5	900	8	9	35	20	13
BENZO(G,H,I)PERYLENE	18/22	150	24000 J	NTC21-SB-21-SO-0001	3.7	4.1	1.94E+03	1.59E+03	5.04E+03	120000	0	2300000	0	4	NC	0	6 through 10	120000	0	13
BENZO(K)FLUORANTHENE	20/22	110	21000 J	NTC21-SB-21-SO-0001	4.1	4.3	1.74E+03	1.58E+03	4.39E+03	350	11	NC	0	1 through 5	9000	1	9	350	11	13
BIS(2-ETHYLHEXYL)PHTHALAT	16/22	51 J	3400 J	NTC21-SB-21-SO-0001	390	410	3.55E+02	3.12E+02	6.92E+02	1100	1	NC	0	1 through 5	46000	0	9	1100	1	13
BUTYL BENZYL PHTHALATE	1/22	97 J	97 J	NTC21-SB-08-SO-0001	350	430	9.70E+01	1.85E+02	2.28E+01	510	0	NC	0	1 through 5	930000	0	6, 8, and 10	510	0	13
CARBAZOLE	4/22	66 J	2400	NTC21-SB-21-SO-0001	700	860	1.09E+03	5.09E+02	4.61E+02	600	3	NC	0	1 through 5	600	3	6	NC	0	13
CHRYSENE	20/22	130 J	31000 J	NTC21-SB-21-SO-0001	4	4.3	2.49E+03	2.26E+03	6.59E+03	1100	5	NC	0	1 through 5	88000	0	9	1100	5	13
DI-N-BUTYL PHTHALATE	2/22	37 J	190 J	NTC21-SB-10-SO-0001	350	430	1.14E+02	1.83E+02	3.45E+01	9200	0	NC	0	1 through 5	2300000	0	6, 8, and 10	9200	0	13
DIBENZO(A,H)ANTHRACENE	12/22	44	1100	NTC21-SB-01-SO-0102	3.5	4.3	3.26E+02	1.79E+02	3.16E+02	11	12	NC	0	1 through 5	90	7	9	11	12	13
DIBENZOFURAN	22/22	39 J	640	NTC21SB21-SO-0001	---	---	2.22E+02	2.22E+02	1.76E+02	680	0	NC	0	1 through 5	NC	0	6 through 10	680	0	13
FLUORANTHENE	22/22	260	84000	NTC21-SB-21-SO-0001	---	---	6.08E+03	6.08E+03	1.78E+04	160000	0	NC	0	1 through 5	3100000	0	9	160000	0	13
FLUORENE	9/22	11	1600	NTC21-SB-21-SO-0001	3.6	4.3	4.62E+02	1.90E+02	4.16E+02	27000	0	NC	0	1 through 5	560000	0	6	27000	0	13
INDENO(1,2,3-CD)PYRENE	16/22	150	36000 J	NTC21-SB-21-SO-0001	3.5	4.3	3.04E+03	2.21E+03	7.60E+03	120	16	NC	0	1 through 5	900	4	9	120	16	13
NAPHTHALENE	22/22	18	520	NTC21-SB-01-SO-0102	---	---	2.37E+02	2.37E+02	1.35E+02	0.47	22	NC	0	1 through 5	12000	0	6	0.47	22	13
PHENANTHRENE	22/22	250	30000	NTC21-SB-21-SO-0001	---	---	3.10E+03	3.10E+03	6.48E+03	120000	0	200000	0	1	NC	0	6 through 10	120000	0	13
PYRENE	22/22	240	70000	NTC21-SB-21-SO-0001	---	---	5.05E+03	5.05E+03	1.48E+04	120000	0	NC	0	1 through 5	2300000	0	9	120000	0	13
Pesticides/PCBs (ug/kg)																				
4,4'-DDD	22/22	0.75 J	520 J	NTC21-SB-10-SO-0001	---	---	1.01E+02	1.01E+02	1.56E+02	66	7	NC	0	1 through 5	3000	0	9	66	7	13
4,4'-DDE	22/22	0.45 J	350 J	NTC21-SB-10-SO-0001	---	---	5.55E+01	5.55E+01	9.08E+01	47	8	NC	0	1 through 5	2000	0	9	47	8	13
4,4'-DDT	22/22	0.77 J	740 J	NTC21-SB-10-SO-0001	---	---	8.14E+01	8.14E+01	1.70E+02	67	6	NC	0	1 through 5	2000	0	9	67	6	13
ALDRIN	2/22	0.23 J	0.33 J	NTC21-SB-01-SO-0102	0.35	0.43	2.80E-01	1.97E-01	3.30E-02	0.65	0	NC	0	1 through 5	40	0	9	0.65	0	13
ALPHA-BHC	7/22	0.28 J	12 J	NTC21-SB-05-SO-0001	0.35	0.43	3.94E+00	1.38E+00	3.16E+00	0.062	7	NC	0	1 through 5	0.5	3	6	0.062	7	13
ALPHA-CHLORDANE	12/22	0.64 J	27 J	NTC21-SB-22-SO-0001	0.35	0.43	5.59E+00	3.14E+00	5.93E+00	13	1	NC	0	1 through 5	NC	0	6 through 10	13	1	13
AROCLOR-1260	14/22	21 J	720 J	NTC21-SB-10-SO-0001	18.1	20.8	2.30E+02	1.50E+02	1.85E+02	24	13	NC	0	1 through 5	NC	0	6 through 10	24	13	13
BETA-BHC	3/22	0.27 J	1 J	NTC21-SB-03-SO-0001	0.35	0.43	6.10E-01	2.46E-01	1.87E-01	0.22	3	NC	0	1 through 5	NC	0	6 through 10	0.22	3	13
DELTA-BHC	7/22	0.42 J	3.5 J	NTC21-SB-10-SO-0001	0.35	0.43	1.35E+00	5.55E-01	8.42E-01	0.062	7	NC	0	1 through 5	NC	0	6 through 10	0.062	7	13
DIELDRIN	15/22	0.33 J	15 J	NTC21-SB-21-SO-0001	0.75	0.82	4.84E+00	3.43E+00	4.37E+00	0.17	15	NC	0	1 through 5	4	4	6	0.17	15	13
ENDOSULFAN I	7/22	0.2 J	14 J	NTC21-SB-10-SO-0001	0.35	0.43	3.88E+00	1.36E+00	3.06E+00	3000	0	NC	0	1 through 5	NC	0	6 through 10	3000	0	13
ENDOSULFAN II	6/22	0.58 J	4.6 J	NTC21-SB-10-SO-0001	0.71	0.83	2.31E+00	9.10E-01	1.18E+00	3000	0	NC	0	1 through 5	NC	0	6 through 10	3000	0	13
ENDOSULFAN SULFATE	12/22	0.96 J	25 J	NTC21-SB-21-SO-0001	0.71	0.82	6.86E+00	3.91E+00	6.50E+00	3000	0	NC	0	1 through 5	NC	0	6 through 10	3000	0	13
ENDRIN	8/22	0.71 J	224	NTC21-SB-10-SO-0001	0.72	0.86	3.94E+01	1.46E+01	4.92E+01	81	1	NC	0	1 through 5	1000	0	6	81	1	13
ENDRIN ALDEHYDE	6/22	0.39 J	28 J	NTC21-SB-10-SO-0001	0.71	0.86	7.90E+00	2.43E+00	6.11E+00	81	0	NC	0	1 through 5	NC	0	6 through 10	81	0	13
ENDRIN KETONE	4/22	0.85 J	44 J	NTC21-SB-21-SO-0001	0.72	0.86	1.24E+01	2.57E+00	9.28E+00	81	0	NC	0	1 through 5	NC	0	6 through 10	81	0	13
GAMMA-BHC (LINDANE)	9/22	0.22 J	20	NTC21-SB-21-SO-0001	0.35	0.4	3.14E+00	1.40E+00	4.26E+00	0.36	7	NC	0	1 through 5	9	1	6	0.36	7	13
GAMMA-CHLORDANE	19/22	0.64 J	189 J	NTC21-SB-10-SO-0001	0.35	0.4	1.96E+01	1.69E+01	4.19E+01	13	3	NC	0	1 through 5	NC	0	6 through 10	13	3	13
HEPTACHLOR EPOXIDE	13/22	0.15 J	3	NTC21-SB-06-SO-0001	0.35	0.4	1.30E+00	8.44E-01	8.99E-01	0.15	12	NC	0	1 through 5	70	0	9	0.15	12	13
METHOXYCHLOR	15/22	0.35 J	37 J	NTC21-SB-04-SO-0001	0.35	0.4	8.50E+00	5.85E+00	8.90E+00	2200	0	NC	0	1 through 5	160000	0	6	2200	0	11
Herbicides (ug/kg)																				
2,4-D	1/22	217 J	217 J	NTC21-SB-13-SO-0001	52.7	61.8	2.17E+02	3.69E+01	4.03E+01	18	1	NC	0	1 through 5	1500	0	6	18	1	11
DICAMBA	7/22	4.86 J	9.99 J	NTC21-SB-14-SO-0001	5.31	6.18	7.22E+00	4.23E+00	2.31E+00	280	0	NC	0	1 through 5	NC	0	6 through 10	280	0	13
DINOSEB	1/22	17.2 J	17.2 J	NTC21-SB-14-SO-0001	26.3	32.2	1.72E+01	1.43E+01	1.04E+00	62	0	NC	0	1 through 5	340	0	6	62	0	11

TABLE 4-5

OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN SURFACE SOIL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	Frequency of Detection	Minimum Result	Maximum Result	Sample with Maximum Detection	Minimum Non-Detection	Maximum Non-Detection	Average Positive Result	Overall Average	Standard Deviation	Minimum Regulatory Screening Value		Minimum Non-TACO Screening Value			Minimum TACO Screening Value			Minimum USEPA Screening Value		
										Value	Exceedances	Value	Exceedances	Source	Value	Exceedances	Source	Value	Exceedances	Source
Dioxins/Furans (ng/kg)																				
1,2,3,4,6,7,8,9-OCDD	2/2	174	**1310**	NTC21-SB-09-SO-0001	---	---	7.42E+02	7.42E+02	8.03E+02	**870**	**1**	NC	0	1 through 5	NC	0	6 through 10	**870**	**1**	**13**
1,2,3,4,6,7,8,9-OCDF	2/2	19.8	141	NTC21-SB-09-SO-0001	---	---	8.04E+01	8.04E+01	8.57E+01	870	0	NC	0	1 through 5	NC	0	6 through 10	870	0	13
1,2,3,4,6,7,8-HPCDD	2/2	17.7	**169**	NTC21-SB-09-SO-0001	---	---	9.34E+01	9.34E+01	1.07E+02	**26**	**1**	NC	0	1 through 5	NC	0	6 through 10	**26**	**1**	**13**
1,2,3,4,6,7,8-HPCDF	2/2	9.64	**82.4**	NTC21-SB-09-SO-0001	---	---	4.60E+01	4.60E+01	5.14E+01	**26**	**1**	NC	0	1 through 5	NC	0	6 through 10	**26**	**1**	**13**
1,2,3,4,7,8,9-HPCDF	2/2	0.952 J	4.08 J	NTC21-SB-09-SO-0001	---	---	2.52E+00	2.52E+00	2.21E+00	26	0	NC	0	1 through 5	NC	0	6 through 10	26	0	13
1,2,3,4,7,8-HXCDD	1/2	1.9 J	1.9 J	NTC21-SB-09-SO-0001	5	5	1.90E+00	2.20E+00	4.24E-01	2.6	0	NC	0	1 through 5	NC	0	6 through 10	2.6	0	13
1,2,3,4,7,8-HXCDF	2/2	1.31 J	**5.91**	NTC21-SB-09-SO-0001	---	---	3.61E+00	3.61E+00	3.25E+00	**2.6**	**1**	NC	0	1 through 5	NC	0	6 through 10	**2.6**	**1**	**13**
1,2,3,6,7,8-HXCDD	2/2	1.14 J	**7.9**	NTC21-SB-09-SO-0001	---	---	4.52E+00	4.52E+00	4.78E+00	**2.6**	**1**	NC	0	1 through 5	NC	0	6 through 10	**2.6**	**1**	**13**
1,2,3,6,7,8-HXCDF	2/2	1.07 J	**11.6**	NTC21-SB-09-SO-0001	---	---	6.34E+00	6.34E+00	7.45E+00	**2.6**	**1**	NC	0	1 through 5	NC	0	6 through 10	**2.6**	**1**	**13**
1,2,3,7,8,9-HXCDD	2/2	0.81 J	**5.17**	NTC21-SB-09-SO-0001	---	---	2.99E+00	2.99E+00	3.08E+00	**2.6**	**1**	NC	0	1 through 5	NC	0	6 through 10	**2.6**	**1**	**13**
1,2,3,7,8,9-HXCDF	2/2	0.358 J	**2.68 J**	NTC21-SB-09-SO-0001	---	---	1.52E+00	1.52E+00	1.64E+00	**2.6**	**1**	NC	0	1 through 5	NC	0	6 through 10	**2.6**	**1**	**13**
1,2,3,7,8-PECDD	2/2	**0.76 J**	**5.9 J**	NTC21-SB-09-SO-0001	---	---	3.33E+00	3.33E+00	3.63E+00	**0.26**	**2**	NC	0	1 through 5	NC	0	6 through 10	**0.26**	**2**	**13**
1,2,3,7,8-PECDF	1/2	1.92 J	1.92 J	NTC21-SB-09-SO-0001	0.462	0.462	1.92E+00	1.08E+00	1.19E+00	8.7	0	NC	0	1 through 5	NC	0	6 through 10	8.7	0	13
2,3,4,6,7,8-HXCDF	2/2	1.84 J	**26.2**	NTC21-SB-09-SO-0001	---	---	1.40E+01	1.40E+01	1.72E+01	**2.6**	**1**	NC	0	1 through 5	NC	0	6 through 10	**2.6**	**1**	**13**
2,3,4,7,8-PECDF	2/2	**3.66 J**	**57.5**	NTC21-SB-09-SO-0001	---	---	3.06E+01	3.06E+01	3.81E+01	**0.87**	**2**	NC	0	1 through 5	NC	0	6 through 10	**0.87**	**2**	**13**
2,3,7,8-TCDD	2/2	0.198 J	**0.816 J**	NTC21-SB-09-SO-0001	---	---	5.07E-01	5.07E-01	4.37E-01	**0.26**	**1**	NC	0	1 through 5	NC	0	6 through 10	**0.26**	**1**	**13**
2,3,7,8-TCDF	1/2	**3.17**	**3.17**	NTC21-SB-09-SO-0001	0.728	0.728	3.17E+00	1.77E+00	1.98E+00	**2.6**	**1**	NC	0	1 through 5	NC	0	6 through 10	**2.6**	**1**	**13**
Inorganics (mg/kg)																				
ALUMINUM	22/22	2470	29500	NTC21-SB-14-SO-0001	---	---	7.62E+03	7.62E+03	6.23E+03	55000	0	78000	0	4	NC	0	6 through 10	55000	0	13
ANTIMONY	6/22	**0.627 J**	**5.22**	NTC21-SB-10-SO-0001	0.513	1.63	2.16E+00	9.55E-01	1.12E+00	**0.27**	**6**	NC	0	1 through 5	5	0	6	**0.27**	**6**	**11**
ARSENIC	22/22	**3.12**	**48.4 J**	NTC21-SB-14-SO-0001	---	---	1.25E+01	1.25E+01	1.22E+01	**0.0013**	**22**	NC	0	1 through 5	31	0	6	**0.0013**	**22**	**13**
BARIUM	22/22	29.3 J	**234 J**	NTC21-SB-14-SO-0001	---	---	7.64E+01	7.64E+01	5.01E+01	**82**	**7**	NC	0	1 through 5	2100	0	6	**82**	**7**	**11**
BERYLLIUM	22/22	0.254	**4.71 J**	NTC21-SB-14-SO-0001	---	---	1.03E+00	1.03E+00	1.13E+00	**3.2**	**2**	NC	0	1 through 5	160	0	9	**3.2**	**2**	**11**
CADMIUM	21/22	0.132	**13**	NTC21-SB-10-SO-0001	0.262	0.262	2.32E+00	2.22E+00	3.16E+00	**0.38**	**19**	NC	0	1 through 5	78	0	9	**0.38**	**19**	**11**
CALCIUM	22/22	2240 J	133000	NTC21-SB-20-SO-0001	---	---	7.16E+04	7.16E+04	3.84E+04	NC	0	NC	0	1 through 5	NC	0	6 through 10	NC	0	11 through 15
CHROMIUM	22/22	5.38 J	**163 J**	NTC21-SB-09-SO-0001	---	---	2.03E+01	2.03E+01	3.25E+01	**28**	**2**	NC	0	1 through 5	**28**	**2**	**6**	276	0	15
COBALT	22/22	**2.31**	**17.7**	NTC21-SB-13-SO-0001	---	---	6.59E+00	6.59E+00	3.64E+00	**0.49**	**22**	NC	0	1 through 5	4700	0	9	**0.49**	**22**	**14**
COPPER	22/22	12.9	**835**	NTC21-SB-10-SO-0001	---	---	9.36E+01	9.36E+01	1.77E+02	**46**	**9**	NC	0	1 through 5	2900	0	9	**46**	**9**	**11**
IRON	22/22	**6660 J**	**69500 J**	NTC21-SB-15-SO-0001	---	---	2.68E+04	2.68E+04	1.49E+04	**640**	**22**	**55000**	**1**	**4**	NC	0	6 through 10	**640**	**22**	**13**
LEAD	22/22	16.7	**428**	NTC21-SB-10-SO-0001	---	---	1.01E+02	1.01E+02	1.14E+02	**14**	**22**	NC	0	1 through 5	**400**	**2**	**9**	**14**	**22**	**11**
MAGNESIUM	22/22	1440	75800	NTC21-SB-19-SO-0001	---	---	3.48E+04	3.48E+04	2.29E+04	325000	0	NC	0	1 through 5	325000	0	9	NC	0	11 through 15
MANGANESE	22/22	**173**	**2420 J**	NTC21-SB-14-SO-0001	---	---	5.89E+02	5.89E+02	5.01E+02	**57**	**22**	NC	0	1 through 5	**1600**	**1**	**9**	**57**	**22**	**13**
MERCURY	22/22	**0.0332**	**8.98**	NTC21-SB-10-SO-0001	---	---	5.68E-01	5.68E-01	1.90E+00	**0.03**	**22**	NC	0	1 through 5	10	0	10	**0.03**	**22**	**13**
NICKEL	22/22	5.56	**56.2 J**	NTC21-SB-09-SO-0001	---	---	2.19E+01	2.19E+01	1.38E+01	**8**	**19**	NC	0	1 through 5	**8**	**19**	**6**	**48**	**2**	**13**
POTASSIUM	22/22	428	1930	NTC21-SB-14-SO-0001	---	---	8.39E+02	8.39E+02	3.64E+02	NC	0	NC	0	1 through 5	NC	0	6 through 10	NC	0	11 through 15
SILVER	3/22	0.233	1.41	NTC21-SB-10-SO-0001	0.103	0.325	7.19E-01	1.83E-01	2.92E-01	1.6	0	NC	0	1 through 5	110	0	6	1.6	0	13
SODIUM	22/22	230	2080	NTC21-SB-17-SO-0001	---	---	9.27E+02	9.27E+02	4.62E+02	NC	0	NC	0	1 through 5	NC	0	6 through 10	NC	0	11 through 15
VANADIUM	22/22	8.94	25.7	NTC21-SB-09-SO-0001	---	---	1.67E+01	1.67E+01	5.09E+00	180	0	NC	0	1 through 5	550	0	9	180	0	13
ZINC	22/22	46.5	**1230**	NTC21-SB-10-SO-0001	---	---	2.47E+02	2.47E+02	3.05E+02	**680**	**3**	NC	0	1 through 5	23000	0	9	**680**	**3**	**13**

Shaded cells and boldface font indicate that the concentration is greater than the minimum regulatory screening value.
NTC21-SB-10-SO-0001 = Soil sample collected at soil boring 10 from 0 to 1 foot.

USEPA = United States Environmental Protection Agency.
TACO = Tiered Approach to Corrective Action Objectives.
J = Estimated value.
NC = No criteria.
ng/kg = Nanogram per kilogram.
ug/kg = Microgram per kilogram.
mg/kg = Milligram per kilogram.

1 = Non-TACO Class 1 Soil to Groundwater.
2 = Non-TACO Ingestion Soil Remediation Objectives (Industrial).
3 = Non-TACO Inhalation Soil Remediation Objectives (Industrial).
4 = Non-TACO Ingestion Soil Remediation Objectives (Residential).
5 = Non-TACO Inhalation Soil Remediation Objectives (Residential).
6 = TACO Class 1 Soil to Groundwater.
7 = TACO Ingestion Soil Remediation Objectives (Industrial).
8 = TACO Inhalation Soil Remediation Objectives (Industrial).
9 = TACO Ingestion Soil Remediation Objectives (Residential).
10 = TACO Inhalation Soil Remediation Objectives (Residential).

11 = USEPA ORNL MCL-Based SSLs.
12 = USEPA Residential SSLs.
13 = USEPA ORNL Risk-Based SSLs.
14 = USEPA Industrial Inhalation SSLs.
15 = USEPA Residential Inhalations SSLs.

TABLE 4-6

SUMMARY OF POSITIVE DETECTIONS IN SURFACE SOIL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	Minimum Regulatory Screening Criteria		NTC21-SB-01	NTC21-SB-02	NTC21-SB-03	NTC21-SB-04	NTC21-SB-05	NTC21-SB-06	NTC21-SB-07	NTC21-SB-08	NTC21-SB-09	NTC21-SB-10	NTC21-SB-11	NTC21-SB-12
			1 to 2 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)
VOLATILES (UG/KG)														
2-BUTANONE	1500	USEPA [1]	4.3 U	4.8 U	5.3 U	5.2 UJ	30 J	4.3 UJ	6 U	5.4 UJ	4.4 UJ	5.3 UJ	5.2 UJ	5.6 UJ
ACETONE	4500	USEPA [1]	4.3 U	130	5.3 U	5.2 U	180 J	14 U	6 U	5.4 U	23 J	5.3 UJ	5.2 UJ	5.6 UJ
BENZENE	0.21	USEPA [1]	1.1 J	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	0.82 J	5.4 U	4.4 U	0.56 J	5.2 U	0.63 J
CARBON DISULFIDE	310	USEPA [1]	2.8 J	4.1 J	1.6 J	6.7	2.3 J	5	2.4 J	5.4 U	7	5.3 U	5.2 U	2.1 J
CYCLOHEXANE	13000	USEPA [1]	1.2 J	4.8 U	0.81 J	0.91 J	1.4 J	4.3 U	1.4 J	1.7 J	4.4 U	2.9 J	5.2 U	2.3 J
ETHYLBENZENE	1.7	USEPA [1]	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U	5.4 U	4.4 U	5.3 U	0.9 J	5.6 U
METHYL CYCLOHEXANE	120000	TACO [5]	2.4 J	0.43 J	1.6 J	2.1 J	2.5 J	4.3 U	3.5 J	2.6 J	4.4 U	3.2 J	5.2 U	3.7 J
TETRACHLOROETHENE	0.049	USEPA [1]	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U
TOLUENE	690	USEPA [2]	1.4 J	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U
TOTAL XYLENES	200	USEPA [1]	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U	5.4 U	4.4 U	5.3 U	1.6 J	5.6 U
SEMIVOLATILES (UG/KG)														
1,1-BIPHENYL	19000	USEPA [1]	62 J	370 U	350 U	360 U	360 U	400 U	360 U	360 U	360 U	370 U	360 U	390 U
2-METHYLNAPHTHALENE	750	USEPA [1]	180	450	330	700	400	640	800	230	340	280	320	450
4-METHYLPHENOL	150	USEPA [1]	400 U	370 U	350 U	360 U	360 U	400 U	360 U	360 U	360 U	370 UJ	360 U	390 U
ACENAPHTHENE	22000	USEPA [1]	880	3.7 U	54	87	81	65	840	42	67	57	290	49
ACENAPHTHYLENE	22000	USEPA [1]	20	56	680	3.6 U	3.6 U	4 U	130	110	3.6 U	35	25	3.9 U
ACETOPHENONE	1100	USEPA [1]	400 U	370 U	350 U	360 U	360 U	400 U	360 U	48 J	360 U	370 U	360 U	390 U
ANTHRACENE	360000	USEPA [1]	1700	59	350	3.6 U	180 J	4 U	1700	150	110	170	590	150
BENZO(A)ANTHRACENE	10	USEPA [1]	4800	240	1100 J	380	250 J	4 U	4200	520 J	250 J	390	1600 J	400
BENZO(A)PYRENE	3.5	USEPA [1]	4200	360	2400 J	3.6 U	390 J	4 U	3200	830 J	460 J	690	2900 J	430
BENZO(B)FLUORANTHENE	35	USEPA [1]	6600	540	3500 J	870	480 J	720	4400	1200 J	670 J	970	4100 J	740
BENZO(G,H,I)PERYLENE	120000	USEPA [1]	2200	340 J	1300 J	290	260 J	4 U	1400	460 J	350 J	480	2000 J	210
BENZO(K)FLUORANTHENE	350	USEPA [1]	2500	120	2000	820	300 J	690	1700	560 J	290 J	260	1600 J	220
BIS(2-ETHYLHEXYL)PHTHALATE	1100	USEPA [1]	400 UJ	200 J	240 J	110 J	240 J	150 J	150 J	190 J	130 J	130 J	280 J	390 UJ
BUTYL BENZYL PHTHALATE	510	USEPA [1]	400 UJ	370 UJ	350 UJ	360 UJ	360 UJ	400 U	360 U	97 J	360 UJ	370 UJ	360 UJ	390 UJ
CARBAZOLE	600	TACO [3]	1000	740 U	700 U	720 U	710 U	810 U	880	720 U	730 U	740 U	720 U	780 U
CHRYSENE	1100	USEPA [1]	5900	270	1300 J	340	280 J	4 U	4600	660 J	320 J	390	1900 J	470
DIBENZO(A,H)ANTHRACENE	11	USEPA [1]	1100	89 J	900 J	3.6 U	78 J	4 U	3.6 U	140 J	81 J	150	470 J	66
DIBENZOFURAN	680	USEPA [1]	540	97 J	110 J	250 J	130 J	200 J	620	76 J	110 J	90 J	180 J	240 J
DI-N-BUTYL PHTHALATE	9200	USEPA [1]	400 U	370 UJ	350 UJ	360 U	360 UJ	400 U	360 U	360 UJ	37 J	190 J	360 U	390 U
FLUORANTHENE	160000	USEPA [1]	14000	420	3300	1100	790	1000	12000	1200	860	1000	5700	1000
FLUORENE	27000	USEPA [1]	960	3.7 U	55	3.6 U	3.6 U	4 U	890	3.6 U	3.6 UJ	50	220	3.9 U
INDENO(1,2,3-CD)PYRENE	120	USEPA [1]	3300	420 J	3.5 UJ	3.6 U	330 J	4 U	2100	630 J	400 J	630	2700 J	300
NAPHTHALENE	0.47	USEPA [1]	520	210	200	300	140	480	370	190	280	210	190	240
PHENANTHRENE	120000	USEPA [1]	9500	620	960	1200	790	810	8400	560	760	650	3100	890
PYRENE	120000	USEPA [1]	11000	420	3000	890	660	870	9400	1100	760	920	4800	860
PESTICIDES/PCBS (UG/KG)														
4,4'-DDD	66	USEPA [1]	14 J	17 J	20 J	4.7 J	130	290	30	51 J	480	520 J	230 J	3.9 J
4,4'-DDE	47	USEPA [1]	10	5.3	9.4	7.9 J	130	220	16	48	65 J	350 J	53 J	7.2 J
4,4'-DDT	67	USEPA [1]	14 J	20 J	23 J	30 J	160 J	110 J	9.1 J	72 J	62 J	740 J	34 J	7.6 J
ALDRIN	0.65	USEPA [1]	0.33 J	0.37 UJ	0.23 J	0.36 UJ	0.35 UJ	0.4 UJ	0.36 UJ	0.36 UJ	0.36 UJ	0.37 UJ	0.36 UJ	0.39 UJ
ALPHA-BHC	0.062	USEPA [2]	0.39 U	0.28 J	5.2 J	0.36 U	12 J	0.3 J	0.36 U	8.9 J	0.36 U	0.37 U	0.36 U	0.39 U
ALPHA-CHLORDANE	13	USEPA [1]	7.4 J	0.64 J	1.1 J	0.36 UJ	0.35 UJ	5.1 J	1.3 J	3.2 J	7.3 J	7.5 J	4.3 J	0.39 UJ
AROCLOR-1260	24	USEPA [1]	20.2 UJ	190 J	130 J	310 J	210 J	310 J	21 J	84 J	130 J	720 J	390 J	20 UJ
BETA-BHC	0.22	USEPA [1]	0.27 J	0.37 U	1 J	0.36 U	0.35 U	0.4 U	0.56 J	0.36 U	0.36 UJ	0.37 UJ	0.36 UJ	0.39 UJ
DELTA-BHC	0.062	USEPA [1]	0.51 J	0.37 U	0.35 U	0.36 U	0.35 U	1.4	0.36 U	0.36 U	0.36 UJ	3.5 J	0.36 UJ	0.56 J
DIELDRIN	0.17	USEPA [1]	0.8 UJ	2 J	1.9 J	13 J	2.8 J	3.5 J	3.7 J	3.5 J	2.5 J	12 J	6.8 J	0.79 UJ
ENDOSULFAN I	3000	USEPA [1]	0.39 UJ	0.37 UJ	0.2 J	3.2 J	0.35 UJ	2.3 J	0.36 UJ	0.36 UJ	0.36 UJ	14 J	4.1 J	0.55 J
ENDOSULFAN II	3000	USEPA [1]	0.8 UJ	1.5 J	1.7 J	0.73 UJ	0.72 UJ	0.81 UJ	0.731 UJ	0.72 UJ	4 J	4.6 J	0.73 UJ	0.79 UJ
ENDOSULFAN SULFATE	3000	USEPA [1]	1.8 J	1.3 J	2.7 J	4.9 J	0.72 UJ	0.81 UJ	0.731 UJ	1.8 J	6.7 J	18 J	13 J	0.79 UJ
ENDRIN	81	USEPA [2]	0.71 J	0.75 UJ	1.1 J	72	0.72 UJ	6.7 J	0.731 U	0.72 UJ	7.3 J	224	0.73 U	0.79 UJ
ENDRIN ALDEHYDE	81	USEPA [2]	0.39 J	0.75 UJ	0.71 UJ	8.6 J	0.72 UJ	0.81 UJ	0.731 UJ	0.72 UJ	6.8 J	28 J	0.73 UJ	1.6 J
ENDRIN KETONE	81	USEPA [2]	0.85 J	0.75 UJ	1.5 J	0.73 UJ	0.72 UJ	0.81 UJ	0.731 UJ	0.72 UJ	0.74 UJ	0.75 UJ	0.73 UJ	0.79 UJ
GAMMA-BHC (LINDANE)	0.36	USEPA [1]	0.25 J	0.37 U	0.49 J	0.36 U	0.35 U	0.4 U	0.44 J	0.36 U	0.36 U	0.37 U	4.7 J	0.39 U

TABLE 4-6

SUMMARY OF POSITIVE DETECTIONS IN SURFACE SOIL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	Minimum Regulatory Screening Criteria		NTC21-SB-01	NTC21-SB-02	NTC21-SB-03	NTC21-SB-04	NTC21-SB-05	NTC21-SB-06	NTC21-SB-07	NTC21-SB-08	NTC21-SB-09	NTC21-SB-10	NTC21-SB-11	NTC21-SB-12
			1 to 2 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)
PESTICIDES/PCBS (UG/KG)														
GAMMA-CHLORDANE	13	USEPA [1]	11 J	1.7 J	3.4 J	71 J	11 J	3.8 J	3.4 J	7 J	5.7 J	189 J	8.3 J	1.3 J
HEPTACHLOR EPOXIDE	0.15	USEPA [1]	0.24 J	0.37 UJ	2 J	0.36 U	2.3 J	3	0.51 J	1 J	0.36 UJ	2.7 J	0.36 UJ	0.69 J
METHOXYCHLOR	2200	USEPA [2]	3.1 J	3.3 J	17 J	37 J	4 J	7.5 J	3.9 J	9.4 J	0.36 UJ	0.37 UJ	0.36 UJ	6.6 J
HERBICIDES (UG/KG)														
2,4-D	18	USEPA [2]	59.4 U	55.8 U	52.7 U	54.3 UJ	53.4 U	60.6 UJ	54.6 UJ	53.9 U	54.9 U	55.8 U	54.3 U	58.9 U
DICAMBA	280	USEPA [1]	5.94 U	6.91 J	5.41 J	6.77 J	5.34 U	8.07 J	4.86 J	5.39 U	5.49 U	5.58 U	5.43 U	5.89 U
DINOSEB	62	USEPA [2]	29.7 U	27.9 U	26.3 U	27.1 U	26.7 U	30.3 U	27.3 U	27 U	27.4 U	27.9 U	27.2 U	29.5 U
DIOXINS/FURANS (UG/KG)														
1,2,3,4,6,7,8,9-OCDD	870	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	1310	NA	NA	NA
1,2,3,4,6,7,8,9-OCDF	870	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	141	NA	NA	NA
1,2,3,4,6,7,8-HPCDD	26	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	169	NA	NA	NA
1,2,3,4,6,7,8-HPCDF	26	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	82.4	NA	NA	NA
1,2,3,4,7,8,9-HPCDF	26	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	4.08 J	NA	NA	NA
1,2,3,4,7,8-HXCDD	2.6	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	1.9 J	NA	NA	NA
1,2,3,4,7,8-HXCDF	2.6	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	5.91	NA	NA	NA
1,2,3,6,7,8-HXCDD	2.6	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	7.9	NA	NA	NA
1,2,3,6,7,8-HXCDF	2.6	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	11.6	NA	NA	NA
1,2,3,7,8,9-HXCDD	2.6	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	5.17	NA	NA	NA
1,2,3,7,8,9-HXCDF	2.6	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	2.68 J	NA	NA	NA
1,2,3,7,8-PECDD	0.26	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	5.9 J	NA	NA	NA
1,2,3,7,8-PECDF	8.7	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	1.92 J	NA	NA	NA
2,3,4,6,7,8-HXCDF	2.6	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	26.2	NA	NA	NA
2,3,4,7,8-PECDF	0.87	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	57.5	NA	NA	NA
2,3,7,8-TCDD	0.26	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	0.816 J	NA	NA	NA
2,3,7,8-TCDF	2.6	USEPA [1]	NA	NA	NA	NA	NA	NA	NA	NA	3.17	NA	NA	NA
METALS (MG/KG)														
ALUMINUM	55000	USEPA [1]	9140	10400	8950	2470	5750	7130	5320	5200	4350	6720	2790	3280
ANTIMONY	0.27	USEPA [2]	0.585 UJ	0.566 UJ	0.627 J	1.38 UJ	0.513 UJ	0.586 UJ	1.36 UJ	0.933	2.06	5.22	1.37 U	1.51 U
ARSENIC	0.0013	USEPA [1]	21.1	11.1	9.93	13.4 J	6.05	7.93 J	7.46 J	9.53	8.14	11.9	5.6	12.9
BARIUM	82	USEPA [2]	52.9 J	91.7 J	68.3 J	34.8 J	44.9 J	43.1 J	42.3 J	55.6 J	86.6 J	161 J	82.3 J	49.6 J
BERYLLIUM	3.2	USEPA [2]	0.521	0.793	0.846	0.429 J	0.47	0.469 J	0.445 J	0.485	0.929	0.826	0.646	0.508
CADMIUM	0.38	USEPA [2]	0.554	0.44	0.605	0.338	0.395	0.132	0.644	1.24	3.81	13	1.94	0.507
CALCIUM	NC	N/A	54000	56300	57000	89000 J	62700	2240 J	98600 J	76300	32000 J	42200	62100	83300
CHROMIUM	28	TACO [4]	17.3	15.1	14.1	7.16 J	13.7 J	11.3 J	12.6 J	9.71	163 J	36.9	11.1	12.6
COBALT	0.49	USEPA [1]	8.64	11	7.43	2.31	6.12	8.67	5.79	6.07	5.19	6.67	2.9	3.27
COPPER	46	USEPA [2]	37.9 J	30.2 J	49.4 J	25.3 J	24.6 J	18.3 J	37.9 J	47	129 J	835	104	31.6
IRON	640	USEPA [1]	48600 J	24100 J	23300 J	26000 J	18200 J	18500 J	16900 J	18400 J	23400 J	35000 J	15000 J	25800 J
LEAD	14	USEPA [2]	29.6 J	57.3 J	106 J	43 J	42.2 J	25.9 J	81.5 J	65.3	167 J	428	118	51.3
MAGNESIUM	325000	TACO [4]	30600	36300	34500	47600	37900 J	1440	53800	38800	13800 J	13600	29100	39600
MANGANESE	57	USEPA [1]	733	965	652	178 J	503	318 J	597 J	456	173	416	205	226
MERCURY	0.03	USEPA [1]	0.0548 J	0.092 J	0.144 J	0.0517	0.0693 J	0.0332	0.0854	0.0612 J	0.495	8.98	0.0648	0.585
NICKEL	8	USEPA [1]	25.4	21.1	18.9	7.18 J	17.2 J	13.7 J	15.9 J	15.9	56.2 J	52.3	10.9	10.4
POTASSIUM	NC	N/A	1180 J	1240 J	1060 J	763	970 J	461	981	749	642	846	438	428
SILVER	1.6	USEPA [1]	0.117 U	0.113 U	0.105 U	0.277 U	0.103 U	0.117 U	0.271 U	0.108 U	0.515	1.41	0.274 U	0.302 U
SODIUM	NC	N/A	1010	833	1220	845	798	594	384	230	868	1000	986	378
VANADIUM	180	USEPA [1]	24.2	19.3	16.8	11.3	12.5	22	14.2	12.5 J	25.7	21.2	11.2	13.8
ZINC	680	USEPA [1]	114 J	151 J	252 J	53.1 J	87.8 J	80.9 J	119 J	172	190	1230	125	70.9

TABLE 4-6

SUMMARY OF POSITIVE DETECTIONS IN SURFACE SOIL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	Minimum Regulatory Screening Criteria		NTC21-SB-13	NTC21-SB-14	NTC21-SB-15	NTC21-SB-16	NTC21-SB-17	NTC21-SB-18	NTC21-SB-19	NTC21-SB-20	NTC21-SB-21	NTC21-SB-22
			0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)
VOLATILES (UG/KG)												
2-BUTANONE	1500	USEPA [1]	6.5 UJ	6.8 UJ	5.5 U	5.3 U	7.8 UJ	5.2 UJ	4.5 U	4.4 UJ	5.2 UJ	6.6 U
ACETONE	4500	USEPA [1]	54 J	6.8 U	5.5 U	5.3 U	47 J	5.2 UJ	4.5 U	4.4 U	5.2 U	21
BENZENE	0.21	USEPA [1]	6.5 UJ	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	**0.74 J**	5.2 U	6.6 U
CARBON DISULFIDE	310	USEPA [1]	6.5 UJ	6.4 J	5.6	5.3 U	16	5.2 U	2.6 J	4.4 U	4.2 J	6.6 U
CYCLOHEXANE	13000	USEPA [1]	6.5 UJ	6.8 U	5.5 U	5.3 U	7.8 U	0.71 J	1.3 J	0.75 J	0.94 J	6.6 U
ETHYLBENZENE	1.7	USEPA [1]	6.5 UJ	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	4.4 U	5.2 U	6.6 U
METHYL CYCLOHEXANE	120000	TACO [5]	0.88 J	0.56 J	0.86 J	0.72 J	0.78 J	1.2 J	2.6 J	1.1 J	1.2 J	6.6 U
TETRACHLOROETHENE	0.049	USEPA [1]	6.5 UJ	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	**1.4 J**	4.4 U	5.2 U	6.6 U
TOLUENE	690	USEPA [2]	6.5 UJ	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	1.1 J	5.2 U	6.6 U
TOTAL XYLENES	200	USEPA [1]	6.5 UJ	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	4.4 U	5.2 U	6.6 U
SEMIVOLATILES (UG/KG)												
1,1-BIPHENYL	19000	USEPA [1]	430 U	410 U	400 U	370 U	400 U	390 U	360 U	350 U	360 U	410 U
2-METHYLNAPHTHALENE	750	USEPA [1]	**840**	**900**	540	460	94	100	98	27	260	710
4-METHYLPHENOL	150	USEPA [1]	430 U	410 U	400 U	370 U	400 U	390 U	360 U	350 UR	50 J	410 U
ACENAPHTHENE	22000	USEPA [1]	4.3 U	4.1 U	4 U	3.7 U	280	13	24	53	2200	92
ACENAPHTHYLENE	22000	USEPA [1]	4.3 U	4.1 U	4 U	3.7 U	70	34	3.6 U	3.5 U	89	4.1 U
ACETOPHENONE	1100	USEPA [1]	430 U	410 U	400 U	370 U	400 U	390 U	360 U	350 U	360 U	410 U
ANTHRACENE	360000	USEPA [1]	4.3 U	4.1 U	4 U	3.7 U	300	37	3.6 U	150	7200	4.1 U
BENZO(A)ANTHRACENE	10	USEPA [1]	4.3 U	**280**	**200 J**	**110**	**350**	**140**	**150**	**200 J**	**22000 J**	**320**
BENZO(A)PYRENE	3.5	USEPA [1]	4.3 U	**860 J**	4 UJ	3.7 U	**600**	**200**	**250**	**560 J**	**38000 J**	**340**
BENZO(B)FLUORANTHENE	35	USEPA [1]	4.3 U	4.1 UJ	**550 J**	**290**	**940**	**310**	**440**	**620 J**	**59000 J**	**710**
BENZO(G,H,I)PERYLENE	120000	USEPA [1]	410	180 J	4 UJ	3.7 U	360	150	170	430 J	24000 J	4.1 U
BENZO(K)FLUORANTHENE	350	USEPA [1]	4.3 U	4.1 UJ	**540 J**	270	320	110	**430**	300 J	**21000 J**	**680**
BIS(2-ETHYLHEXYL)PHTHALATE	1100	USEPA [1]	78 J	51 J	400 UJ	77 J	400 U	390 U	110 J	140 J	**3400 J**	410 UJ
BUTYL BENZYL PHTHALATE	510	USEPA [1]	430 UJ	410 U	400 UJ	370 UJ	400 UJ	390 UJ	360 UJ	350 UJ	360 UJ	410 UJ
CARBAZOLE	600	TACO [3]	860 U	810 U	800 U	750 U	800 U	780 U	720 U	66 J	**2400**	820 U
CHRYSENE	1100	USEPA [1]	4.3 UJ	410 J	250 J	130 J	480	190	190 J	280 J	**31000 J**	460
DIBENZO(A,H)ANTHRACENE	11	USEPA [1]	4.3 U	4.1 UJ	4 UJ	3.7 U	**100**	**44**	3.6 U	3.5 UJ	**690 J**	4.1 U
DIBENZOFURAN	680	USEPA [1]	320 J	320 J	250 J	130 J	210 J	46 J	39 J	41 J	640	250 J
DI-N-BUTYL PHTHALATE	9200	USEPA [1]	430 U	410 UJ	400 U	370 U	400 U	390 U	360 U	350 U	360 U	410 U
FLUORANTHENE	160000	USEPA [1]	2000	810	670	260	1100	340	400	830	84000	970
FLUORENE	27000	USEPA [1]	4.3 U	4.1 U	4 U	3.7 U	320	11	3.6 U	52	1600	4.1 U
INDENO(1,2,3-CD)PYRENE	120	USEPA [1]	4.3 U	4.1 UJ	4 UJ	**150**	**510**	**200**	**250**	**350 J**	**36000 J**	**350**
NAPHTHALENE	0.47	USEPA [1]	**350**	**350**	**350**	**160**	**53**	**49**	**44**	**18**	**210**	**300**
PHENANTHRENE	120000	USEPA [1]	2900	1300	1100	1300	1100	290	250	720	30000	1100
PYRENE	120000	USEPA [1]	1700	740	570	240	960	290	360	650	70000	890
PESTICIDES/PCBS (UG/KG)												
4,4'-DDD	66	USEPA [1]	1.2 J	1.6 J	2.9 J	0.75 J	9.2 J	1.1 J	25	0.86 J	**150 J**	**230**
4,4'-DDE	47	USEPA [1]	1.4 J	1.9 J	3.5	0.61 J	1.9 J	0.45 J	12	5.5 J	**190**	**82**
4,4'-DDT	67	USEPA [1]	9.9 J	7.1 J	8.5 J	1.7 J	2.6 J	0.77 J	15 J	1.5 J	**390 J**	**71 J**
ALDRIN	0.65	USEPA [1]	0.43 UJ	0.4 UJ	0.4 UJ	0.37 U	0.4 UJ	0.39 UJ	0.36 UJ	0.35 UJ	0.35 UJ	0.41 UJ
ALPHA-BHC	0.062	USEPA [2]	0.43 U	0.4 U	0.4 U	**0.44**	0.4 U	0.39 U	0.36 U	0.35 U	0.35 U	**0.46 J**
ALPHA-CHLORDANE	13	USEPA [1]	0.43 UJ	0.4 UJ	0.4 UJ	0.37 U	0.4 UJ	0.39 UJ	0.95 J	1.3 J	0.35 UJ	**27 J**
AROCLOR-1260	24	USEPA [1]	**120 J**	20.8 UJ	20.4 UJ	19.1 U	20.5 UJ	19.8 UJ	**43 J**	18.1 UJ	**450 J**	**110 J**
BETA-BHC	0.22	USEPA [1]	0.43 U	0.4 U	0.4 U	0.37 U	0.4 UJ	0.39 UJ	0.36 U	0.35 UJ	0.35 UJ	0.41 U
DELTA-BHC	0.062	USEPA [1]	0.43 U	0.4 UJ	0.4 U	0.37 U	**0.65 J**	**2.4 J**	0.36 U	0.35 UJ	0.35 UJ	**0.42 J**
DIELDRIN	0.17	USEPA [1]	**3.1 J**	0.82 UJ	0.81 UJ	0.75 U	0.81 UJ	0.78 UJ	**0.68 J**	**0.33 J**	**15 J**	**1.8 J**
ENDOSULFAN I	3000	USEPA [1]	0.43 UJ	0.4 UJ	0.4 UJ	0.37 U	2.8 J	0.39 UJ	0.36 UJ	0.35 UJ	0.35 UJ	0.41 UJ
ENDOSULFAN II	3000	USEPA [1]	1.5 J	0.82 UJ	0.81 UJ	0.75 U	0.81 UJ	0.78 UJ	0.58 J	0.71 UJ	0.72 UJ	0.83 UJ
ENDOSULFAN SULFATE	3000	USEPA [1]	2.7 J	0.82 UJ	0.81 UJ	0.75 U	0.81 UJ	0.78 UJ	0.96 J	0.71 UJ	25 J	3.4 J
ENDRIN	81	USEPA [2]	0.86 U	0.82 U	0.81 U	0.75 UJ	0.81 UJ	0.78 UJ	0.73 U	1 J	0.72 UJ	2.2 J
ENDRIN ALDEHYDE	81	USEPA [2]	0.86 UJ	0.82 U	0.81 UJ	0.75 UJ	2	0.78 U	0.73 UJ	0.71 UJ	0.72 UJ	0.83 UJ
ENDRIN KETONE	81	USEPA [2]	0.86 UJ	0.82 UJ	0.81 UJ	0.75 U	0.81 UJ	0.78 UJ	0.73 UJ	3.2 J	44 J	0.83 UJ
GAMMA-BHC (LINDANE)	0.36	USEPA [1]	**0.96**	0.22 J	0.4 U	0.37 U	0.4 U	0.39 U	0.36 U	**0.7 J**	**20**	**0.53 J**

TABLE 4-6

SUMMARY OF POSITIVE DETECTIONS IN SURFACE SOIL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS
PAGE 4 OF 4

Parameter	Minimum Regulatory Screening Criteria		NTC21-SB-13	NTC21-SB-14	NTC21-SB-15	NTC21-SB-16	NTC21-SB-17	NTC21-SB-18	NTC21-SB-19	NTC21-SB-20	NTC21-SB-21	NTC21-SB-22
			0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)	0 to 1 (ft bgs)
PESTICIDES/PCBS (UG/KG)												
GAMMA-CHLORDANE	13	USEPA [1]	2.2 J	0.4 UJ	0.67 J	0.37 U	1.8 J	0.64 J	4.1 J	1.6 J	0.35 UJ	**44 J**
HEPTACHLOR EPOXIDE	0.15	USEPA [1]	**1.1 J**	0.4 UJ	0.15 J	0.37 U	0.4 UJ	0.39 UJ	**0.74**	**0.95 J**	0.35 UJ	**1.5 J**
METHOXYCHLOR	2200	USEPA [2]	17 J	0.4 UJ	0.4 UJ	0.35 J	15 J	2 J	0.62 J	0.35 UJ	0.35 UJ	0.71 J
HERBICIDES (UG/KG)												
2,4-D	18	USEPA [2]	**217 J**	61.1 UJ	60 U	56.1 U	60.4 U	58.3 U	54.3 U	53.1 U	53.7 U	61.8 U
DICAMBA	280	USEPA [1]	8.56 J	9.99 J	6 U	5.61 U	6.04 U	5.83 U	5.43 U	5.31 U	5.37 U	6.18 U
DINOSEB	62	USEPA [2]	32.2 U	17.2 J	30 U	28.1 U	30.2 UJ	29.1 UJ	27.1 U	26.6 UJ	26.9 UJ	30.9 U
DIOXINS/FURANS (UG/KG)												
1,2,3,4,6,7,8,9-OCDD	870	USEPA [1]	NA	NA	NA	NA	174	NA	NA	NA	NA	NA
1,2,3,4,6,7,8,9-OCDF	870	USEPA [1]	NA	NA	NA	NA	19.8	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDD	26	USEPA [1]	NA	NA	NA	NA	17.7	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDF	26	USEPA [1]	NA	NA	NA	NA	9.64	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-HPCDF	26	USEPA [1]	NA	NA	NA	NA	0.952 J	NA	NA	NA	NA	NA
1,2,3,4,7,8-HXCDD	2.6	USEPA [1]	NA	NA	NA	NA	5 U	NA	NA	NA	NA	NA
1,2,3,4,7,8-HXCDF	2.6	USEPA [1]	NA	NA	NA	NA	1.31 J	NA	NA	NA	NA	NA
1,2,3,6,7,8-HXCDD	2.6	USEPA [1]	NA	NA	NA	NA	1.14 J	NA	NA	NA	NA	NA
1,2,3,6,7,8-HXCDF	2.6	USEPA [1]	NA	NA	NA	NA	1.07 J	NA	NA	NA	NA	NA
1,2,3,7,8,9-HXCDD	2.6	USEPA [1]	NA	NA	NA	NA	0.81 J	NA	NA	NA	NA	NA
1,2,3,7,8,9-HXCDF	2.6	USEPA [1]	NA	NA	NA	NA	0.358 J	NA	NA	NA	NA	NA
1,2,3,7,8-PECDD	0.26	USEPA [1]	NA	NA	NA	NA	**0.76 J**	NA	NA	NA	NA	NA
1,2,3,7,8-PECDF	8.7	USEPA [1]	NA	NA	NA	NA	0.462 U	NA	NA	NA	NA	NA
2,3,4,6,7,8-HXCDF	2.6	USEPA [1]	NA	NA	NA	NA	1.84 J	NA	NA	NA	NA	NA
2,3,4,7,8-PECDF	0.87	USEPA [1]	NA	NA	NA	NA	**3.66 J**	NA	NA	NA	NA	NA
2,3,7,8-TCDD	0.26	USEPA [1]	NA	NA	NA	NA	0.198 J	NA	NA	NA	NA	NA
2,3,7,8-TCDF	2.6	USEPA [1]	NA	NA	NA	NA	0.728 U	NA	NA	NA	NA	NA
METALS (MG/KG)												
ALUMINUM	55000	USEPA [1]	6210	29500	18400	5180	11400	11800	3030	3530	2590	4570
ANTIMONY	0.27	USEPA [2]	**2.51 J**	1.57 UJ	1.49 UJ	1.31 UJ	0.575 U	0.595 U	0.515 UJ	0.553 U	**1.6**	1.63 UJ
ARSENIC	0.0013	USEPA [1]	**10.7 J**	**48.4 J**	**48.3 J**	**4.86 J**	**8.23**	**7.73**	**5.95 J**	**3.12**	**4.87**	**6.96 J**
BARIUM	82	USEPA [2]	69.8 J	**234 J**	**164 J**	55.9 J	71.6 J	**97.7 J**	29.3 J	33 J	50.5 J	61.3 J
BERYLLIUM	3.2	USEPA [2]	2.44 J	**4.71 J**	**3.69 J**	1.04 J	0.836	0.774	0.29 J	0.254	0.332	0.878 J
CADMIUM	0.38	USEPA [2]	**8.45**	**2.63**	**4.18**	0.262 U	**0.845**	**0.621**	**1.25**	**0.678**	**5.25**	**1.13**
CALCIUM	NC	N/A	21100 J	85900 J	114000 J	113000 J	33600	10700	120000	133000	130000	97300 J
CHROMIUM	28	TACO [4]	14.8 J	17.7 J	10.8 J	8.17 J	17.4	17.1	5.38 J	6.46	9.75	13.6 J
COBALT	0.49	USEPA [1]	**17.7**	**5.29**	**9.12**	**5.51**	**8.5**	**11.5**	**3.55**	**2.51**	**3.4**	**3.84**
COPPER	46	USEPA [2]	**296 J**	**50.6 J**	45.8 J	17 J	26.4	27.8	16.8 J	12.9	**131**	**64.7 J**
IRON	640	USEPA [1]	**52200 J**	**47000 J**	**69500 J**	**17300 J**	**27200 J**	**23500 J**	**18500 J**	**6660 J**	**16400 J**	**15300 J**
LEAD	14	USEPA [2]	**407 J**	**67.2 J**	**31.7 J**	**29.2 J**	**29.2**	**27.2**	**60.3 J**	**16.7**	**124**	**215 J**
MAGNESIUM	325000	TACO [4]	8120	3940	21500	62900	20400	6180	75800	70700	75500	43900
MANGANESE	57	USEPA [1]	**494 J**	**2420 J**	**1250 J**	**321 J**	**464**	**1070**	**327 J**	**332**	**270**	**579 J**
MERCURY	0.03	USEPA [1]	**0.106**	**0.0618**	**0.0472**	**0.0702 J**	**0.0477**	**0.0641**	**0.0374 J**	**0.0359**	**1.07**	**0.233 J**
NICKEL	8	USEPA [1]	**43.1 J**	**20.1 J**	**34.6 J**	**13.2 J**	**21.7**	**21.3**	**9.26 J**	5.56	**32**	**16.2 J**
POTASSIUM	NC	N/A	435	1930	763	753	1270	1130	571	581	782	493
SILVER	1.6	USEPA [1]	0.308 U	0.313 U	0.297 U	0.262 U	0.115 U	0.119 U	0.103 U	0.111 U	0.233	0.325 U
SODIUM	NC	N/A	588	1590	1020	1260	2080	1100	1750	395	530	933
VANADIUM	180	USEPA [1]	22.3	15.8	15.1	11.5	23.8	21.8	8.94	10.8	14.2	18.1
ZINC	680	USEPA [1]	**884 J**	186 J	352 J	73.6 J	134	111	148 J	46.5	**746**	103 J

1 = United States Environmental Protection Agency (USEPA) Oakridge National Laboratory (ORNL) Risk-Based Soil Screening Level (SSL).
2 = USEPA Oakridge National Laboratory (ORNL) Maximum Contaminant Level (MCL) Based SSL.
3 = Illinois Tiered Approach to Corrective Action Objectives; Soil Component of Groundwater Ingestion Class 1 (pH = 7.86; Obtained from IDW laboratory results).
4 = Illinois Tiered Approach to Corrective Action Objectives (TACO); Soil Remediation Objectives Residential Ingestion.
5 = Illinois Tiered Approach to Corrective Action Objectives (Non-TACO); Soil Remediation Objectives Industrial/Commercial Construction Inhalation.
USEPA = United States Environmental Protection Agency.
TACO = Tiered Approach to Corrective Action Objectives.
Shaded cells and boldface font indicate that the concentration is greater than the minimum regulatory screening value.
J = Value is estimated. ug/kg = Microgram per kilogram.
U = Analyte not detected at the reporting limit left of the letter. ng/kg = Nanogram per kilogram.
UJ = Numerical detection limit for the undetected result is estimated. NA = Not analyzed.
mg/kg = Milligram per kilogram. NC = No criteria.

TABLE 4-7

OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN SUBSURFACE SOIL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	Frequency of Detection	Minimum Result	Maximum Result	Sample with Maximum Detection	Minimum Non-Detection	Maximum Non-Detection	Average Positive Result	Overall Average	Standard Deviation	Minimum Regulatory Screening Value		Minimum Non-TACO Screening Value			Minimum TACO Screening Value			Minimum USEPA Screening Value		
										Value	Exceedances	Value	Exceedances	Source	Value	Exceedances	Source	Value	Exceedances	Source
Volatile Organics (ug/kg)																				
ISOPROPYLBENZENE	1/22	0.97 J	0.97 J	NTC21-SB-09-SO-0204	1.3	7.7	9.70E-01	2.51E+00	7.38E-01	1100	0	NC	0	1 through 5	NC	0	6 through 10	1100	0	13
METHYL CYCLOHEXANE	18/22	1.2 J	11	NTC21-SB-18-SO-0507	4.9	6.7	3.94E+00	3.72E+00	2.58E+00	120000	0	120000	0	3 and 5	NC	0	6 through 10	490000	0	14 and 15
TETRACHLOROETHENE	2/22	3.3 J	18	NTC21-SB-19-SO-0204	3.8	7.7	1.07E+01	3.39E+00	3.30E+00	0.049	2	NC	0	1 through 5	60	0	6	0.049	2	13
TOLUENE	8/22	1.4 J	5.6	NTC21-SB-17-SO-0507	4.3	7.7	2.99E+00	2.87E+00	1.13E+00	690	0	NC	0	1 through 5	12000	0	6	690	0	11
TOTAL XYLENES	1/22	2.2 J	2.2 J	NTC21-SB-17-SO-0507	1	7.7	2.20E+00	2.58E+00	6.66E-01	200	0	NC	0	1 through 5	150000	0	6	200	0	13
TRICHLOROFLUOROMETHANE	3/22	1.4 J	2.8 J	NTC21-SB-02-SO-0204	3.8	7.7	2.33E+00	2.60E+00	5.63E-01	830	0	NC	0	1 through 5	NC	0	6 through 10	830	0	13
TRICHLOROFLUOROMETHANE	3/22	1.4 J	2.8 J	NTC21-SB-03-SO-0204	3.8	7.7	2.33E+00	2.60E+00	5.63E-01	830	0	NC	0	1 through 5	NC	0	6 through 10	830	0	13
2-BUTANONE	5/22	9 J	28 J	NTC21-SB-04-SO-0406	2	7.7	1.42E+01	5.18E+00	6.13E+00	1500	0	NC	0	1 through 5	NC	0	6 through 10	1500	0	13
ACETONE	5/22	25 J	87	NTC21-SB-19-SO-0204	3.8	7.7	5.68E+01	1.50E+01	2.60E+01	4500	0	NC	0	1 through 5	25000	0	6	4500	0	13
BENZENE	10/22	0.41 J	4.8	NTC21-SB-18-SO-0507	0.68	7.7	1.83E+00	2.27E+00	1.12E+00	0.21	10	NC	0	1 through 5	30	0	6	0.21	10	13
CARBON DISULFIDE	13/22	1.2 J	12	NTC21-SB-20-SO-0406	3.8	6.8	4.48E+00	3.73E+00	2.76E+00	310	0	NC	0	1 through 5	32000	0	6	310	0	13
CHLOROMETHANE	2/22	1 J	2.2 J	NTC21-SB-19-SO-0204	0.75	15	1.60E+00	4.77E+00	1.77E+00	49	0	110000	0	5	NC	0	6 through 10	49	0	13
CIS-1,2-DICHLOROETHENE	1/22	1.5 J	1.5 J	NTC21-SB-10-SO-0406	1.7	15	1.50E+00	4.94E+00	1.56E+00	21	0	NC	0	1 through 5	400	0	6	21	0	11
CYCLOHEXANE	17/22	0.62 J	9	NTC21-SB-18-SO-0507	0.78	6.7	2.41E+00	2.37E+00	1.86E+00	13000	0	280000	0	3 and 5	NC	0	6 through 10	13000	0	13
ETHYLBENZENE	4/22	0.7 J	1.9 J	NTC21-SB-17-SO-0507	1.1	7.7	1.23E+00	2.35E+00	8.42E-01	1.7	1	NC	0	1 through 5	13000	0	6	1.7	1	13
Semivolatile Organics (ug/kg)																				
1,1-BIPHENYL	1/22	96 J	96 J	NTC21-SB-07-SO-0204	33	580	9.60E+01	1.92E+02	5.12E+01	19000	0	150000	0	1	NC	0	6 through 10	19000	0	13
2-METHYLNAPHTHALENE	16/22	2.4 J	2100	NTC21-SB-03-SO-0204	3.7	7.5	3.49E+02	2.54E+02	4.83E+02	750	2	NC	0	1 through 5	NC	0	6 through 10	750	2	13
ACENAPHTHENE	12/22	12	880	NTC21-SB-07-SO-0204	3.7	5.8	1.66E+02	9.14E+01	2.06E+02	22000	0	NC	0	1 through 5	570000	0	6	22000	0	13
ACENAPHTHYLENE	11/22	2.8 J	2000	NTC21-SB-03-SO-0204	3.7	4.4	2.23E+02	1.12E+02	4.23E+02	22000	0	85000	0	1	NC	0	6 through 10	22000	0	13
ACETOPHENONE	1/22	230 J	230 J	NTC21-SB-02-SO-0204	46	580	2.30E+02	1.99E+02	4.57E+01	1100	0	NC	0	1 through 5	NC	0	6 through 10	1100	0	13
ANTHRACENE	11/22	2.9 J	5000	NTC21-SB-03-SO-0204	3.7	4.4	6.98E+02	3.50E+02	1.08E+03	360000	0	NC	0	1 through 5	12000000	0	6	360000	0	13
BENZALDEHYDE	1/13	220 J	220 J	NTC21-SB-02-SO-0204	62	450	2.20E+02	1.85E+02	4.88E+01	810	0	3300	0	1	NC	0	6 through 10	810	0	13
BENZO(A)ANTHRACENE	19/22	2.5 J	32000	NTC21-SB-03-SO-0204	3.7	4.4	2.14E+03	1.85E+03	6.80E+03	10	17	NC	0	1 through 5	900	3	9	10	17	13
BENZO(A)PYRENE	13/22	12	27000	NTC21-SB-03-SO-0204	3.7	5.8	2.70E+03	1.60E+03	5.73E+03	3.5	13	NC	0	1 through 5	90	11	9	3.5	13	13
BENZO(B)FLUORANTHENE	17/22	6.4	41000	NTC21-SB-03-SO-0204	3.7	4.4	3.09E+03	2.39E+03	8.68E+03	35	14	NC	0	1 through 5	900	5	9	35	14	13
BENZO(G,H,I)PERYLENE	16/22	4.1	11000	NTC21-SB-03-SO-0204	3.7	4.4	9.73E+02	7.08E+02	2.33E+03	120000	0	2300000	0	4	NC	0	6 through 10	120000	0	13
BENZO(K)FLUORANTHENE	17/22	7.2	14000	NTC21-SB-03-SO-0204	3.7	4.4	1.14E+03	8.78E+02	2.96E+03	350	6	NC	0	1 through 5	9000	1	9	350	6	13
BIS(2-ETHYLHEXYL)PHTHALATE	7/22	54	280	NTC21-SB-08-SO-0204 NTC21-SB-03-SO-0204	370	580	1.70E+02	1.96E+02	5.83E+01	1100	0	NC NC	0 0	1 through 5 1 through 5	46000	0	9	1100	0	13
BUTYL BENZYL PHTHALATE	1/22	110 J	110 J	NTC21-SB-02-SO-0406	360	580	1.10E+02	2.01E+02	3.08E+01	510	0	NC	0	1 through 5	930000	0	6, 8, and 10	510	0	13
CARBAZOLE	2/22	430 J	1000	NTC21-SB-07-SO-0204	720	1200	7.15E+02	4.40E+02	1.35E+02	600	1	NC	0	1 through 5	600	1	6	NC	0	11 through 15
CHRYSENE	21/22	3.4 J	34000	NTC21-SB-03-SO-0204	4.4	4.4	2.09E+03	2.00E+03	7.23E+03	1100	3	NC	0	1 through 5	88000	0	9	1100	3	13
DIBENZO(A,H)ANTHRACENE	9/22	2.4 J	3300	NTC21-SB-03-SO-0204	3.7	5.8	4.41E+02	1.82E+02	6.99E+02	11	8	NC	0	1 through 5	90	4	9	11	8	13
DIBENZOFURAN	12/22	34 J	670	NTC21-SB-07-SO-0204	370	580	2.10E+02	2.09E+02	1.48E+02	680	0	NC	0	1 through 5	NC	0	6 through 10	680	0	13
FLUORANTHENE	19/22	6.8	56000	NTC21-SB-03-SO-0204	1.9	3.7	4.25E+03	3.67E+03	1.20E+04	160000	0	NC	0	1 through 5	3100000	0	9	160000	0	13
FLUORENE	6/22	2.5 J	1200	NTC21-SB-07-SO-0204	3.7	90	2.54E+02	7.27E+01	2.55E+02	27000	0	NC	0	1 through 5	560000	0	6	27000	0	13
INDENO(1,2,3-CD)PYRENE	13/22	12	16000	NTC21-SB-03-SO-0204	3.7	5.8	1.71E+03	1.01E+03	3.39E+03	120	11	NC	0	1 through 5	900	2	9	120	11	13
NAPHTHALENE	16/22	3.8 J	4600	NTC21-SB-22-SO-0204	3.7	4.4	5.94E+02	4.32E+02	1.02E+03	0.47	16	NC	0	1 through 5	12000	0	6	0.47	16	13
PHENANTHRENE	21/22	1.8	11000	NTC21-SB-07-SO-0204 NTC21-SB-03-SO-0204	4.4	4.4	1.50E+03	1.43E+03	3.16E+03	120000	0	200000	0	1	NC	0	6 through 10	120000	0	13
PYRENE	19/22	6.9	52000	NTC21-SB-03-SO-0204	3.7	4.4	3.73E+03	3.22E+03	1.11E+04	120000	0	NC	0	1 through 5	2300000	0	9	120000	0	13
METHOXYCHLOR	10/22	0.8 J	34.2 J	NTC21-SB-02-SO-0406	0.37	0.571	7.04E+00	3.31E+00	7.49E+00	9900	0	NC	0	1 through 5	160000	0	6	2200	0	11
Pesticides/PCBs																				
4,4'-DDD	9/22	0.37 J	480	NTC21-SB-06-SO-0204	0.19	1.2	1.20E+02	4.94E+01	1.24E+02	66	3	NC	0	1 through 5	3000	0	9	66	3	13
4,4'-DDE	10/22	0.69 J	300	NTC21-SB-06-SO-0204	0.75	1.2	5.70E+01	2.61E+01	6.91E+01	47	2	NC	0	1 through 5	2000	0	9	47	2	13
4,4'-DDT	10/22	1.2 J	240 J	NTC21-SB-06-SO-0204	0.75	1.2	4.01E+01	1.84E+01	5.16E+01	67	1	NC	0	1 through 5	2000	0	9	67	1	13
ALDRIN	1/22	0.83 J	0.83 J	NTC21-SB-02-SO-0406	0.36	0.571	8.30E-01	2.32E-01	1.36E-01	0.65	1	NC	0	1 through 5	40	0	9	0.65	1	13
ALPHA-BHC	6/22	0.27 J	2.8 J	NTC21-SB-02-SO-0204	0.12	0.571	8.50E-01	3.75E-01	5.61E-01	0.062	6	NC	0	1 through 5	0.5	3	6	0.062	6	13
ALPHA-CHLORDANE	7/22	0.41 J	26 J	NTC21-SB-22-SO-0204	0.36	0.571	8.09E+00	2.71E+00	6.57E+00	13	2	NC	0	1 through 5	NC	0	6 through 10	13	2	13
AROCLOR-1242	1/22	47 J	47 J	NTC21-SB-02-SO-0406	18.4	29.4	4.70E+01	1.21E+01	7.87E+00	5.3	1	NC	0	1 through 5	NC	0	6 through 10	5.3	1	13
AROCLOR-1260	8/22	29 J	440 J	NTC21-SB-06-SO-0204	19	29.4	1.57E+02	6.37E+01	1.06E+02	24	8	NC	0	1 through 5	NC	0	6 through 10	24	8	13
BETA-BHC	2/22	0.57 J	1.1 J	NTC21-SB-10-SO-0406	0.12	0.571	8.35E-01	2.54E-01	2.09E-01	0.22	2	NC	0	1 through 5	NC	0	6 through 10	0.22	2	13
DELTA-BHC	5/22	0.25 J	3	NTC21-SB-06-SO-0204	0.36	0.571	1.12E+00	4.11E-01	6.41E-01	0.062	5	NC	0	1 through 5	NC	0	6 through 10	0.062	5	13
DIELDRIN	8/22	0.87 J	5.6 J	NTC21-SB-06-SO-0204	0.75	1.2	2.26E+00	1.09E+00	1.29E+00	0.17	8	NC	0	1 through 5	4	1	6	0.17	8	13
ENDOSULFAN I	4/22	0.29 J	3.22 J	NTC21-SB-02-SO-0406	0.36	0.571	1.44E+00	4.29E-01	6.82E-01	3000	0	NC	0	1 through 5	NC	0	6 through 10	3000	0	13
ENDOSULFAN II	6/22	0.19 J	1.26	NTC21-SB-02-SO-0406	0.75	1.2	8.32E-01	5.32E-01	2.83E-01	3000	0	NC	0	1 through 5	NC	0	6 through 10	3000	0	13
ENDOSULFAN SULFATE	8/22	0.65 J	8.7 J	NTC21-SB-06-SO-0204	0.75	1.2	3.11E+00	1.40E+00	2.15E+00	3000	0	NC	0	1 through 5	NC	0	6 through 10	3000	0	13
ENDRIN	5/22	0.82 J	3.2 J	NTC21-SB-11-SO-0204	0.73	1.2	1.73E+00	7.16E-01	6.89E-01	81	0	NC	0	1 through 5	1000	0	6	81	0	11
ENDRIN ALDEHYDE	2/22	1.1 J	4.9 J	NTC21-SB-10-SO-0406	0.19	1.2	3.00E+00	6.34E-01	9.68E-01	81	0	NC	0	1 through 5	NC	0	6 through 10	81	0	11

TABLE 4-7

OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN SUBSURFACE SOIL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS
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Parameter	Frequency of Detection	Minimum Result	Maximum Result	Sample with Maximum Detection	Minimum Non-Detection	Maximum Non-Detection	Average Positive Result	Overall Average	Standard Deviation	Minimum Regulatory Screening Value		Minimum Non-TACO Screening Value			Minimum TACO Screening Value			Minimum USEPA Screening Value		
										Value	Exceedances	Value	Exceedances	Source	Value	Exceedances	Source	Value	Exceedances	Source
Pesticides/PCBs																				
ENDRIN KETONE	1/22	1.5 J	1.5 J	NTC21-SB-03-SO-0204	0.19	1.2	1.50E+00	4.51E-01	2.49E-01	81	0	NC	0	1 through 5	NC	0	6 through 10	81	0	11
GAMMA-BHC (LINDANE)	4/22	0.33 J	2.3 J	NTC21-SB-06-SO-0204	0.36	0.571	8.78E-01	3.27E-01	4.47E-01	0.36	3	NC	0	1 through 5	9	0	6	0.36	3	13
GAMMA-CHLORDANE	12/22	0.15 J	46 J	NTC21-SB-22-SO-0204	0.37	0.571	7.33E+00	4.09E+00	1.02E+01	13	2	NC	0	1 through 5	NC	0	6 through 10	13	2	13
HEPTACHLOR EPOXIDE	7/22	0.26 J	6.9 J	NTC21-SB-22-SO-0204	0.12	0.571	2.38E+00	8.92E-01	1.87E+00	0.15	7	NC	0	1 through 5	70	0	9	0.15	7	13
Herbicides (ug/kg)																				
2,4-D	1/22	54.6 J	54.6 J	NTC21-SB-06-SO-0204	28.1	86.6	5.46E+01	3.10E+01	7.21E+00	18	1	NC	0	1 through 5	1500	0	6	18	1	11
DICAMBA	5/22	6.13 J	29.2 J	NTC21-SB-16-SO-0204	2.81	8.66	1.15E+01	4.91E+00	5.68E+00	280	0	NC	0	1 through 5	NC	0	6 through 10	280	0	13
Dioxins (ng/kg)																				
1,2,3,4,6,7,8,9-OCDD	1/1	1950	1950	NTC21-SB-02-SO-0204	---	---	1.95E+03	1.95E+03	---	870	1	NC	0	1 through 5	NC	0	6 through 10	870	1	13
1,2,3,4,6,7,8,9-OCDF	1/1	44.8	44.8	NTC21-SB-02-SO-0204	---	---	4.48E+01	4.48E+01	---	870	0	NC	0	1 through 5	NC	0	6 through 10	870	0	13
1,2,3,4,6,7,8-HPCDD	1/1	167	167	NTC21-SB-02-SO-0204	---	---	1.67E+02	1.67E+02	---	26	1	NC	0	1 through 5	NC	0	6 through 10	26	1	13
1,2,3,4,6,7,8-HPCDF	1/1	18.1	18.1	NTC21-SB-02-SO-0204	---	---	1.81E+01	1.81E+01	---	26	0	NC	0	1 through 5	NC	0	6 through 10	26	0	13
1,2,3,4,7,8,9-HPCDF	1/1	1.74 J	1.74 J	NTC21-SB-02-SO-0204	---	---	1.74E+00	1.74E+00	---	26	0	NC	0	1 through 5	NC	0	6 through 10	26	0	13
1,2,3,4,7,8-HXCDD	1/1	1.04 J	1.04 J	NTC21-SB-02-SO-0204	---	---	1.04E+00	1.04E+00	---	2.6	0	NC	0	1 through 5	NC	0	6 through 10	2.6	0	13
1,2,3,4,7,8-HXCDF	1/1	2.56 J	2.56 J	NTC21-SB-02-SO-0204	---	---	2.56E+00	2.56E+00	---	2.6	0	NC	0	1 through 5	NC	0	6 through 10	2.6	0	13
1,2,3,6,7,8-HXCDD	1/1	3.62 J	3.62 J	NTC21-SB-02-SO-0204	---	---	3.62E+00	3.62E+00	---	2.6	1	NC	0	1 through 5	NC	0	6 through 10	2.6	1	13
1,2,3,6,7,8-HXCDF	1/1	1.39 J	1.39 J	NTC21-SB-02-SO-0204	---	---	1.39E+00	1.39E+00	---	2.6	0	NC	0	1 through 5	NC	0	6 through 10	2.6	0	13
1,2,3,7,8,9-HXCDD	1/1	2.42 J	2.42 J	NTC21-SB-02-SO-0204	---	---	2.42E+00	2.42E+00	---	2.6	0	NC	0	1 through 5	NC	0	6 through 10	2.6	0	13
1,2,3,7,8,9-HXCDF	1/1	0.682 J	0.682 J	NTC21-SB-02-SO-0204	---	---	6.82E-01	6.82E-01	---	2.6	0	NC	0	1 through 5	NC	0	6 through 10	2.6	0	13
1,2,3,7,8-PECDD	1/1	0.579 J	0.579 J	NTC21-SB-02-SO-0204	---	---	5.79E-01	5.79E-01	---	0.26	1	NC	0	1 through 5	NC	0	6 through 10	0.26	1	13
2,3,4,6,7,8-HXCDF	1/1	2.14 J	2.14 J	NTC21-SB-02-SO-0204	---	---	2.14E+00	2.14E+00	---	2.6	0	NC	0	1 through 5	NC	0	6 through 10	2.6	0	13
2,3,4,7,8-PECDF	1/1	2.75 J	2.75 J	NTC21-SB-02-SO-0204	---	---	2.75E+00	2.75E+00	---	0.87	1	NC	0	1 through 5	NC	0	6 through 10	0.87	1	13
2,3,7,8-TCDD	1/1	0.279 J	0.279 J	NTC21-SB-02-SO-0204	---	---	2.79E-01	2.79E-01	---	0.26	1	NC	0	1 through 5	NC	0	6 through 10	0.26	1	13
Inorganics (mg/kg)																				
ALUMINUM	22/22	3720	24300	NTC21-SB-15-SO-0204	---	---	9.34E+03	9.34E+03	5.75E+03	55000	0	78000	0	4	NC	0	6 through 10	55000	0	13
ANTIMONY	1/22	0.643	0.643	NTC21-SB-10-SO-0406	0.27	1.69	6.43E-01	4.40E-01	2.25E-01	0.27	1	NC	0	1 through 5	5	0	6	0.27	1	11
ARSENIC	22/22	4.16	85 J	NTC21-SB-15-SO-0204	---	---	1.21E+01	1.21E+01	1.65E+01	0.0013	22	NC	0	1 through 5	31	0	6	0.0013	22	13
BARIUM	22/22	12.4 J	157 J	NTC21-SB-15-SO-0204	---	---	6.93E+01	6.93E+01	4.01E+01	82	7	NC	0	1 through 5	2100	0	6	82	7	11
BERYLLIUM	22/22	0.225	4.05	NTC21-SB-12-SO-0204	---	---	1.04E+00	1.04E+00	1.01E+00	3.2	2	NC	0	1 through 5	160	0	9	3.2	2	11
CADMIUM	20/22	0.124	9.62	NTC21-SB-15-SO-0204	0.283	0.74	1.32E+00	1.22E+00	2.09E+00	0.38	15	NC	0	1 through 5	78	0	9	0.38	15	11
CALCIUM	22/22	4280 J	177000	NTC21-SB-02-SO-0406	---	---	5.49E+04	5.49E+04	4.36E+04	NC.	0	NC	0	1 through 5	NC	0	6 through 10	NC	0	11 through 15
CHROMIUM	22/22	7.9	34.3 J	NTC21-SB-04-SO-0406	---	---	1.51E+01	1.51E+01	6.74E+00	28	0	NC	0	1 through 5	28	0	6	276	0	15
COBALT	22/22	2.25	23.8	NTC21-SB-12-SO-0204	---	---	8.90E+00	8.90E+00	5.57E+00	0.49	22	NC	0	1 through 5	4700	0	9	0.49	22	13
COPPER	22/22	9.91	124 J	NTC21-SB-07-SO-0204	---	---	4.76E+01	4.76E+01	2.96E+01	46	9	NC	0	1 through 5	2900	0	9	46	9	11
IRON	22/22	6560	65800 J	NTC21-SB-15-SO-0204	---	---	2.70E+04	2.70E+04	1.19E+04	640	22	55000	1	4	NC	0	6 through 10	640	22	13
LEAD	22/22	8.86	228 J	NTC21-SB-07-SO-0204	---	---	5.45E+01	5.45E+01	5.71E+01	14	20	NC	0	1 through 5	107	0	6	14	20	11
MAGNESIUM	22/22	3150	81500	NTC21-SB-02-SO-0406	---	---	2.69E+04	2.69E+04	2.21E+04	325000	0	NC	0	1 through 5	325000	0	9	NC	0	11 through 15
MANGANESE	22/22	203	1690	NTC21-SB-09-SO-0204	---	---	6.62E+02	6.62E+02	3.91E+02	57	22	NC	0	1 through 5	1600	1	9	57	22	13
MERCURY	21/22	0.0138	0.484	NTC21-SB-12-SO-0204	0.0151	0.0151	1.04E-01	9.95E-02	1.10E-01	0.03	17	NC	0	1 through 5	8	0	6	0.03	17	13
NICKEL	22/22	4.42	44.4 J	NTC21-SB-15-SO-0204	---	---	2.32E+01	2.32E+01	1.07E+01	48	0	NC	0	1 through 5	1600	0	9	48	0	13
POTASSIUM	22/22	558	1930	NTC21-SB-16-SO-0204	---	---	1.04E+03	1.04E+03	4.13E+02	NC	0	NC	0	1 through 5	NC	0	6 through 10	NC	0	11 through 15
SELENIUM	1/22	1.31 J	1.31 J	NTC21-SB-15-SO-0204	0.334	1.71	1.31E+00	4.73E-01	2.63E-01	0.26	1	NC	0	1 through 5	2.4	0	6	0.26	1	11
SODIUM	22/22	210	3370	NTC21-SB-16-SO-0204	---	---	1.04E+03	1.04E+03	8.03E+02	NC	0	NC	0	1 through 5	NC	0	6 through 10	NC	0	11 through 15
VANADIUM	22/22	10.5	33.5	NTC21-SB-04-SO-0406	---	---	1.90E+01	1.90E+01	6.21E+00	180	0	NC	0	1 through 5	550	0	9	180	0	13
ZINC	22/22	38.5	1010 J	NTC21-SB-04-SO-0406	---	---	1.84E+02	1.84E+02	2.01E+02	680	1	NC	0	1 through 5	23000	0	9	680	1	13

J = Estimated value.
ug/kg = Microgram per kilogram.
mg/kg = Milligram per kilogram.
ng/kg = Nanogram per kilogram.
USEPA = United States Environmental Protection Agency.
TACO = Tiered Approach to Corrective Action Objectives.
NC = No criteria.

1 = Non-TACO Class 1 Soil to Groundwater.
2 = Non-TACO Ingestion Soil Remediation Objectives (Industrial).
3 = Non-TACO Inhalation Soil Remediation Objectives (Industrial).
4 = Non-TACO Ingestion Soil Remediation Objectives (Residential).
5 = Non-TACO Inhalation Soil Remediation Objectives (Residential).
6 = TACO Class 1 Soil to Groundwater.
7 = TACO Ingestion Soil Remediation Objectives (Industrial).
8 = TACO Inhalation Soil Remediation Objectives (Industrial).
9 = TACO Ingestion Soil Remediation Objectives (Residential).
10 = TACO Inhalation Soil Remediation Objectives (Residential).

11 = USEPA ORNL MCL-Based SSLs.
12 = USEPA Residential SSLs.
13 = USEPA ORNL Risk-Based SSLs.
14 = USEPA Industrial Inhalation SSLs.
15 = USEPA Residential Inhalations SSLs.

Shaded cells and boldface font indicate that the concentration is greater than the minimum regulatory screening values.

TABLE 4-8

SUMMARY OF POSITIVE DETECTIONS IN SUBSURFACE SOIL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	Minimum Screening Value	Minimum Screening Source	NTC21-SB-02 2 to 4 (ft bgs)	NTC21-SB-02 4 to 6 (ft bgs)	NTC21-SB-03 2 to 4 (ft bgs)	NTC21-SB-04 4 to 6 (ft bgs)	NTC21-SB-05 2 to 4 (ft bgs)	NTC21-SB-06 2 to 4 (ft bgs)	NTC21-SB-07 2 to 4 (ft bgs)	NTC21-SB-08 2 to 4 (ft bgs)	NTC21-SB-09 2 to 4 (ft bgs)	NTC21-SB-10 4 to 6 (ft bgs)	NTC21-SB-11 2 to 4 (ft bgs)	NTC21-SB-12 2 to 4 (ft bgs)	NTC21-SB-13 2 to 4 (ft bgs)
VOLATILES (UG/KG)															
2-BUTANONE	1500	USEPA [1]	5.8 U	2 U	5.4 UJ	28 J	4.3 UJ	6.2 UJ	5.1 UJ	6.8 UJ	9 J	4.9 UJ	5.6 UJ	7.7 UJ	4.2 U
ACETONE	4500	USEPA [1]	5.8 U	35	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U	6.8 U	4.7 UJ	4.9 UJ	5.6 UJ	7.7 UJ	4.2 U
BENZENE	0.21	USEPA [1]	5.8 UJ	0.68 U	5.4 UJ	1.2 J	0.41 J	6.2 UJ	0.71 J	2.6 J	4.7 U	1.2 J	5.6 U	7.7 U	1.6 J
CARBON DISULFIDE	310	USEPA [1]	5.8 UJ	1.9 J	5.4 UJ	8.1	4.3 U	6.2 UJ	3.1 J	6.8 U	4.2 J	1.3 J	4.6 J	2 J	6.3
CHLOROMETHANE	49	USEPA [1]	12 U	0.75 U	11 UJ	13 U	8.6 U	12 UJ	10 U	14 U	9.4 U	9.8 U	11 U	15 U	8.4 U
CIS-1,2-DICHLOROETHENE	21	USEPA [3]	12 UJ	1.7 U	11 UJ	13 U	8.6 U	12 UJ	10 U	14 U	9.4 U	1.5 J	11 U	15 U	8.4 U
CYCLOHEXANE	13000	USEPA [1]	1.1 J	0.78 U	1 J	0.74 J	1.7 J	0.9 J	2.2 J	3.8 J	0.62 J	3 J	1 J	2.6 J	2.5 J
ETHYLBENZENE	1.7	USEPA [1]	5.8 UJ	1.1 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U	1.3 J	4.7 U	4.9 U	5.6 U	7.7 U	0.7 J
ISOPROPYLBENZENE	1100	USEPA [1]	5.8 UJ	1.3 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U	6.8 U	0.97 J	4.9 U	5.6 U	7.7 U	4.2 U
METHYL CYCLOHEXANE	120000	Non-TACO [5]	1.8 J	1.3 J	1.6 J	1.4 J	3.1 J	2.2 J	4.5 J	7.1	1.2 J	5	1.5 J	4.8 J	4.6
TETRACHLOROETHENE	0.049	USEPA [1]	5.8 UJ	3.3 J	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U
TOLUENE	690	USEPA [3]	5.8 UJ	1.5 J	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U	4.3 J	4.7 U	1.6 J	5.6 U	7.7 U	2.7 J
TOTAL XYLENES	200	USEPA [1]	5.8 UJ	1 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U
TRICHLOROFLUOROMETHANE	830	USEPA [1]	2.8 J	1.4 J	2.8 J	6.6 U	4.3 U	6.2 UJ	5.1 U	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U
SEMIVOLATILES (UG/KG)															
1,1-BIPHENYL	19000	USEPA [1]	380 U	33 U	360 U	580 U	370 U	440 U	96 J	450 U	420 U	400 U	400 U	430 U	400 U
2-METHYLNAPHTHALENE	750	USEPA [1]	1000 J	30	2100	7.5 U	150	500	400	84	22	8.8	240	480	4 U
ACENAPHTHENE	22000	USEPA [1]	110	200	480	5.8 U	33	68	880	38	38	12	57	4.3 U	4 U
ACENAPHTHYLENE	22000	USEPA [1]	3.8 U	32	2000	25	19	4.4 U	69	88	16	2.8 J	19	170	4 U
ACETOPHENONE	1100	USEPA [1]	230 J	46 U	360 U	580 U	370 U	440 U	390 U	450 U	420 U	400 U	400 U	430 U	400 U
ANTHRACENE	360000	USEPA [1]	130	560	5000	8	3.7 U	4.4 U	1400	150	110	16	76	220	4 U
BENZALDEHYDE	810	USEPA [1]	220 J	62 U	360 U	580 UR	370 U	440 UR	390 UR	450 U	420 U	400 U	400 U	430 U	400 UR
BENZO(A)ANTHRACENE	10	USEPA [1]	280	2000	32000	120	140 J	260	4300	430 J	81 J	16	150 J	420 J	14
BENZO(A)PYRENE	3.5	USEPA [1]	320	1200	27000	5.8 U	210 J	520	3600	740 J	170 J	33	220 J	620 J	4 U
BENZO(B)FLUORANTHENE	35	USEPA [1]	450	1600	41000	230	290 J	860	4300	1200 J	280 J	52	380 J	1200 J	6.4
BENZO(G,H,I)PERYLENE	120000	USEPA [1]	250 J	730	11000	65	130 J	320	1600	470 J	100 J	23	120 J	330 J	4 U
BENZO(K)FLUORANTHENE	350	USEPA [1]	150	620	14000	220	120 J	840	1700	460 J	92 J	17	88 J	380 J	7.2
BIS(2-ETHYLHEXYL)PHTHALATE	1100	USEPA [1]	230 J	69 J	280 J	580 U	170 J	440 U	390 U	280 J	420 U	400 U	400 U	430 U	400 U
BUTYL BENZYL PHTHALATE	510	USEPA [1]	380 UJ	110 J	360 UJ	580 U	370 UJ	440 U	390 U	450 UJ	420 U	400 U	400 UJ	430 UJ	400 U
CARBAZOLE	600	TACO [2]	750 U	430 J	720 U	1200 U	740 U	870 U	1000	900 U	840 U	800 U	790 U	860 U	790 U
CHRYSENE	1100	USEPA [1]	290	2100	34000	100	170 J	360	4900	580 J	120 J	23	160 J	530 J	8
BENZO(A,H)ANTHRACENE	11	USEPA [1]	66 J	240	3300	5.8 U	38 J	4.4 U	3.9 U	160 J	28 J	4 UJ	34 J	100 J	4 U
BENZOFURAN	680	USEPA [1]	310 J	150 J	490	580 U	66 J	180 J	670	36 J	420 U	400 U	74 J	330 J	400 U
FLUORANTHENE	160000	USEPA [1]	650	4700	56000	200	360	930	13000	1100	450	78	520	1400	15
FLUORENE	27000	USEPA [1]	3.8 U	180	90 U	5.8 U	3.7 U	4.4 U	1200	57	68	16	4 U	4.3 U	4 U
INDENO(1,2,3-CD)PYRENE	120	USEPA [1]	330 J	890	16000	5.8 U	200 J	420	2500	690 J	160 J	28	150 J	470 J	4 U
NAPHTHALENE	0.47	USEPA [1]	470	33	1100	10	58	230	550	43	180	8.9	1700	440	4 U
PHENANTHRENE	120000	USEPA [1]	1100	2200	11000	34	380	970	11000	560	290	67	470	2100	19
PYRENE	120000	USEPA [1]	540	3200	52000	200	320	760	10000	950	340	63	420	1000	14
PESTICIDES/PCBS (UG/KG)															
4,4'-DDD	66	USEPA [1]	7.9 J	0.19 U	11 J	1.2 U	30 J	480	0.78 U	31 J	0.37 J	1.7 J	190	0.87 U	0.79 U
4,4'-DDE	47	USEPA [1]	8.2	17.3 J	15	1.2 U	22	300	0.78 U	20	0.84 UJ	0.69 J	35 J	1.7 J	0.79 U
4,4'-DDT	67	USEPA [1]	8 J	8.53 J	16 J	1.2 UJ	14 J	240 J	0.78 UJ	31 J	0.84 UJ	1.9 J	18 J	1.2 J	0.79 UJ
ALDRIN	0.65	USEPA [1]	0.37 UJ	0.83 J	0.36 UJ	0.571 U	0.36 UJ	0.43 UJ	0.38 U	0.45 UJ	0.42 UJ	0.4 UJ	0.39 UJ	0.43 UJ	0.39 U
ALPHA-BHC	0.062	USEPA [1]	2.8 J	0.12 UJ	0.37 J	0.571 U	0.36 U	0.64 J	0.38 U	0.45 U	0.42 U	0.71 J	0.39 U	0.43 U	0.39 U
ALPHA-CHLORDANE	13	USEPA [1]	0.37 UJ	0.41 J	0.36 UJ	0.571 U	0.62 J	9.9 J	0.38 U	2 J	0.42 UJ	0.73 J	17 J	0.43 UJ	0.39 U
AROCLOR-1242	5.3	USEPA [1]	19.2 U	47 J	18.4 U	29.4 U	18.7 U	22.2 U	19.8 U	23.1 U	21.4 U	20.5 U	20.2 U	22.1 U	20.2 U
AROCLOR-1260	24	USEPA [1]	69 J	122 J	29 J	29.4 U	130 J	440 J	19.8 U	120 J	21.4 UJ	20.5 UJ	72 J	22.1 UJ	20.2 U
BETA-BHC	0.22	USEPA [1]	0.37 UJ	0.12 U	0.36 U	0.571 U	0.36 U	0.57 J	0.38 U	0.45 U	0.42 UJ	1.1 J	0.39 UJ	0.43 UJ	0.39 U
DELTA-BHC	0.062	USEPA [1]	0.37 U	1.48 J	0.36 U	0.571 U	0.36 U	3	0.38 U	0.45 U	0.42 UJ	0.52 J	0.39 UJ	0.34 J	0.39 U
DIELDRIN	0.17	USEPA [1]	0.87 J	2.89 J	1.1 J	1.2 U	1.6 J	5.6 J	0.78 U	1.1 J	0.84 UJ	0.81 UJ	1.7 J	0.87 UJ	0.79 U
ENDOSULFAN I	3000	USEPA [1]	0.37 UJ	3.22 J	0.36 UJ	0.571 U	0.36 UJ	0.43 UJ	0.38 U	0.45 UJ	0.42 UJ	0.96 J	0.39 UJ	1.3 J	0.39 U
ENDOSULFAN II	3000	USEPA [1]	0.59 J	1.26	0.19 J	1.2 U	1.1 J	0.88 UJ	0.78 U	1.2 J	0.84 UJ	0.81 UJ	0.8 UJ	0.87 UJ	0.79 U
ENDOSULFAN SULFATE	3000	USEPA [1]	1.3 J	3.91	0.72 J	1.2 U	0.65 J	8.7 J	0.78 U	0.73 J	0.84 UJ	0.81 UJ	3.1 J	0.87 UJ	0.79 U
ENDRIN	81	USEPA [3]	0.82 J	1.84 J	0.73 UJ	1.2 UJ	1.5 J	0.88 U	0.78 UJ	1.3 J	0.84 U	0.81 U	3.2 J	0.87 UJ	0.79 UJ
ENDRIN ALDEHYDE	81	USEPA [3]	0.76 UJ	0.19 U	0.73 UJ	1.2 UJ	0.739 UJ	0.88 UJ	0.78 UJ	0.91 UJ	0.84 UJ	4.9 J	0.8 UJ	1.1 J	0.79 UJ
ENDRIN KETONE	81	USEPA [3]	0.76 UJ	0.19 U	1.5 J	1.2 U	0.739 UJ	0.88 UJ	0.78 U	0.91 UJ	0.84 UJ	0.81 UJ	0.8 UJ	0.87 UJ	0.79 U
GAMMA-BHC (LINDANE)	0.36	USEPA [1]	0.37 U	0.46	0.33 J	0.571 U	0.36 U	2.3 J	0.38 U	0.45 U	0.42 U	0.42 J	0.39 U	0.43 U	0.39 U
GAMMA-CHLORDANE	13	USEPA [1]	3.5 J	1.07 J	2.4 J	0.571 U	3.9 J	4.5 J	0.38 U	4.2 J	0.15 J	1.7 J	19 J	1.1 J	0.39 U
HEPTACHLOR EPOXIDE	0.15	USEPA [1]	0.9 J	0.12 U	0.39 J	0.571 U	0.53 J	6.3	0.38 U	1.4 J	0.42 UJ	0.4 UJ	0.39 UJ	0.43 UJ	0.39 U
METHOXYCHLOR	2200	USEPA [3]	1.2 J	34.2 J	4.3 J	0.571 UJ	2.8 J	11 J	2.7 J	3.7 J	0.8 J	0.4 UJ	0.39 UJ	8.9 J	0.39 UJ

TABLE 4-8

SUMMARY OF POSITIVE DETECTIONS IN SUBSURFACE SOIL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	Minimum Screening		NTC21-SB-02		NTC21-SB-03	NTC21-SB-04	NTC21-SB-05	NTC21-SB-06	NTC21-SB-07	NTC21-SB-08	NTC21-SB-09	NTC21-SB-10	NTC21-SB-11	NTC21-SB-12	NTC21-SB-13
	Value	Source	2 to 4 (ft bgs)	4 to 6 (ft bgs)	2 to 4 (ft bgs)	4 to 6 (ft bgs)	2 to 4 (ft bgs)	2 to 4 (ft bgs)	2 to 4 (ft bgs)	2 to 4 (ft bgs)	2 to 4 (ft bgs)	4 to 6 (ft bgs)	2 to 4 (ft bgs)	2 to 4 (ft bgs)	2 to 4 (ft bgs)
HERBICIDES (UG/KG)															
2,4-D	18	USEPA [3]	56.3 U	28.1 U	54.2 U	86.6 UJ	55.1 U	**54.6 J**	58.1 UJ	67.8 U	62.9 U	60.4 U	59.4 U	64.9 U	59.3 UJ
DICAMBA	280	USEPA [1]	6.89 J	2.81 U	6.81 J	8.66 U	5.51 U	6.13 J	5.81 U	6.78 U	6.29 UJ	6.04 U	5.94 U	6.49 U	5.93 U
DIOXINS/FURANS (NG/KG)															
1,2,3,4,6,7,8,9-OCDD	870	USEPA [1]	**1950**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8,9-OCDF	870	USEPA [1]	44.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDD	26	USEPA [1]	**167**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDF	26	USEPA [1]	18.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-HPCDF	26	USEPA [1]	1.74 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HXCDD	2.6	USEPA [1]	1.04 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HXCDF	2.6	USEPA [1]	2.56 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HXCDD	2.6	USEPA [1]	**3.62 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HXCDF	2.6	USEPA [1]	1.39 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HXCDD	2.6	USEPA [1]	2.42 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HXCDF	2.6	USEPA [1]	0.682 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PECDD	0.26	USEPA [1]	**0.579 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-HXCDF	2.6	USEPA [1]	2.14 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,7,8-PECDF	0.87	USEPA [1]	**2.75 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDD	0.26	USEPA [1]	**0.279 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
METALS (MG/KG)															
ALUMINUM	55000	USEPA [1]	4590	5090	4830	13200	7820	4450	6830	9510	17400	9450	4900	12300	6440
ANTIMONY	0.27	USEPA [3]	1.42 UJ	0.27 U	1.36 UJ	0.892 UJ	0.54 U	1.62 U	0.556 UJ	0.671 U	0.645 U	**0.643**	1.46 U	1.69 U	0.546 UJ
ARSENIC	0.0013	USEPA [1]	**8.57**	**4.16**	**10.4**	**14.6 J**	**7.32**	**6.39**	**8.88 J**	**12**	**7.34**	**9.71**	**6**	**7.09**	**8.73**
BARIUM	82	USEPA [3]	42.6 J	48.8	44.6 J	**115 J**	48 J	55.3 J	44.9 J	61.7 J	**140 J**	60.9 J	81.2 J	**103 J**	28.1 J
BERYLLIUM	3.2	USEPA [3]	0.985	0.28	0.694	1.26 J	0.604	0.603	0.397 J	0.844	1.46	0.506	1.35	**4.05**	0.425 J
CADMIUM	0.38	USEPA [3]	0.283 U	0.74 U	**0.395**	**2.49**	**0.449**	**1.51**	**0.606**	**0.898**	**0.653**	**0.414**	**0.979**	**4.15**	**0.909**
CALCIUM	NC	N/A	86600 J	177000	109000 J	36100 J	50200	133000	24900 J	59000	26600	57800	10500	24200	30100 J
CHROMIUM	28	TACO [2]	10.1	7.97	10.8	**34.3 J**	14.2	16.5	10.9 J	16	19.3	16.2	10.7	12.1	12.7 J
COBALT	0.49	USEPA [1]	**3.18**	**2.25**	**4.52**	**15.8**	**8.23**	**3.59**	**6.25**	**10.3**	**9.54**	**9.49**	**6.8**	**23.8**	**7.28**
COPPER	46	USEPA [3]	23.8 J	9.91	34.4 J	**72.6 J**	31.7	**77.1**	**124 J**	**46.5**	37.8	**66.6**	**69.9**	**59.8**	24.5 J
IRON	640	USEPA [1]	**15000 J**	**6560**	**18600 J**	**30500 J**	**20700 J**	**15100 J**	**26600 J**	**27600 J**	**25800 J**	**24900 J**	**40100 J**	**32900 J**	**22900 J**
LEAD	14	USEPA [3]	**35.6 J**	10.8	**63.2 J**	**184 J**	**37 J**	**100 J**	**228 J**	**66.5**	**29.1**	**38.4**	**94.3**	**41.3**	**18.3 J**
MAGNESIUM	325000	TACO [4]	36700	81500	58300	15800	24100	57900	14600	38000	5180	29200	3150	10700	18400
MANGANESE	57	USEPA [1]	**294**	**270**	**413**	**267 J**	**419**	**354**	**465 J**	**583**	**1690**	**650**	**203**	**760**	**744 J**
MERCURY	0.03	USEPA [1]	**0.0963 J**	0.03	**0.215 J**	**0.0897**	**0.0375 J**	**0.237**	**0.0778**	**0.047 J**	**0.0822**	**0.0742**	**0.0889**	**0.484**	**0.0545**
NICKEL	48	USEPA [1]	10.2	4.42	13.4	34 J	22.5	13.1	14.6 J	28.4	23.2	25.9	19.2	42.7	22.5 J
POTASSIUM	NC	N/A	658 J	603	785 J	1320	956	746	558	1110	1780	1570	607	683	953
SELENIUM	0.26	USEPA [3]	0.849 UJ	1.65 U	0.818 UJ	0.535 UJ	0.54 UJ	1.29 UJ	0.334 UJ	1.01 UJ	0.387 U	0.924 U	0.878 U	1.01 U	0.82 U
SODIUM	NC	N/A	817	289	1590	1460	922	792	427	210	2920	483	885	601	521
VANADIUM	180	USEPA [1]	12.8	10.5	15.2	33.5	16.8 J	15.4 J	17.4	20.2 J	28	21.7	15.5	20.5	18.4
ZINC	680	USEPA [1]	110 J	38.5	115 J	**1010 J**	90.6 J	151 J	181 J	229	156	116	244	358	216 J

TABLE 4-8

SUMMARY OF POSITIVE DETECTIONS IN SUBSURFACE SOIL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS
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Parameter	NTC21-SB-14	NTC21-SB-15			NTC21-SB-16	NTC21-SB-17	NTC21-SB-18			NTC21-SB-19	NTC21-SB-20	NTC21-SB-21	NTC21-SB-22
	2 to 4 (ft bgs)	2 to 4 (ft bgs)	NTC21SB15-SO-0204-	NTC21SB15-SO-0204-	2 to 4 (ft bgs)	5 to 7 (ft bgs)	5 to 7 (ft bgs)	NTC21SB18-SO-0507-	NTC21SB18-SO-0507-	2 to 4 (ft bgs)	4 to 6 (ft bgs)	6 to 8 (ft bgs)	2 to 4 (ft bgs)
VOLATILES (UG/KG)													
2-BUTANONE	11	4.9 U	5.05 U	5.2 UJ	14	3.8 UJ	4.5 UJ	4.25 U	4 U	9.1	4 UJ	5.1 UJ	5.5 U
ACETONE	58	25 J	25 J	42 U	79	3.8 UJ	4.5 UJ	4.25 U	4 U	87	4 U	5.1 U	5.5 U
BENZENE	6.7 U	4.9 U	5.05 U	5.2 U	4.9 U	3 J	4.8	3.45	2.1 J	5 U	1.2 J	1.6 J	5.5 U
CARBON DISULFIDE	3.2 J	1.4 J	2.6	3.8 J	4.9 U	3.8 U	1.2 J	1.2 J	4 U	5 U	12	5.1 U	9
CHLOROMETHANE	13 U	9.9 U	9.95 U	10 U	1 J	7.6 U	8.9 U	8.45 U	8 U	2.2 J	8 U	10 U	11 U
CIS-1,2-DICHLOROETHENE	13 U	9.9 U	9.95 U	10 U	9.8 U	7.6 U	8.9 U	8.45 U	8 U	10 U	8 U	10 U	11 U
CYCLOHEXANE	6.7 U	4.9 U	5.05 U	5.2 U	4.9 U	4.4	9	6.2	3.4 J	5 U	2.5 J	3.2 J	0.75 J
ETHYLBENZENE	6.7 U	4.9 U	5.05 U	5.2 U	4.9 U	1.9 J	1 J	1 J	4 U	5 U	4 U	5.1 U	5.5 U
ISOPROPYLBENZENE	6.7 U	4.9 U	5.05 U	5.2 U	4.9 U	3.8 U	4.5 U	4.25 U	4 U	5 U	4 U	5.1 U	5.5 U
METHYL CYCLOHEXANE	6.7 U	4.9 U	5.05 U	5.2 U	4.9 U	8.7	11	8.2	5.4	5 U	5.4	4.4 J	1.4 J
TETRACHLOROETHENE	6.7 U	4.9 U	5.05 U	5.2 U	4.9 U	3.8 U	4.5 U	4.25 U	4 U	18	4 U	5.1 U	5.5 U
TOLUENE	6.7 U	4.9 U	5.05 U	5.2 U	4.9 U	5.6	5.4	4	2.6 J	5 U	1.4 J	1.4 J	5.5 U
TOTAL XYLENES	6.7 U	4.9 U	5.05 U	5.2 U	4.9 U	2.2 J	4.5 U	4.25 U	4 U	5 U	4 U	5.1 U	5.5 U
TRICHLOROFLUOROMETHANE	6.7 U	4.9 U	5.05 U	5.2 U	4.9 U	3.8 U	4.5 U	4.25 U	4 U	5 U	4 U	5.1 U	5.5 U
SEMIVOLATILES (UG/KG)													
1,1-BIPHENYL	440 U	430 U	435 U	440 U	430 U	370 U	370 U	365 U	360 U	400 U	380 U	370 U	410 U
2-METHYLNAPHTHALENE	4.4 U	99	104.5	110	17	3.7 U	3.7 U	3.65 U	3.6 U	33	2.4 J	3.7 U	410
ACENAPHTHENE	4.4 U	4.3 U	4.35 U	4.4 U	4.3 U	3.7 U	3.7 U	3.65 U	3.6 U	12	3.8 U	3.7 U	62
ACENAPHTHYLENE	4.4 U	12	11.5	11	4.3 U	3.7 U	3.7 U	3.65 U	3.6 U	4 U	3.8 U	3.7 U	4.1 U
ACETOPHENONE	440 U	430 U	435 U	440 U	430 U	370 U	370 U	365 U	360 U	400 U	380 U	370 U	410 U
ANTHRACENE	4.4 U	4.3 U	4.35 U	4.4 U	4.3 U	3.7 U	3.7 U	3.65 U	3.6 U	4 U	2.9 J	3.7 U	4.1 U
BENZALDEHYDE	440 UR	430 UR	440 U	440 U	430 UR	370 U	370 U	365 U	360 U	400 UR	380 U	370 U	410 UR
BENZO(A)ANTHRACENE	4.4 U	47 J	34.5	22 J	16	3.7 U	3.7 U	3.65 U	3.6 U	150	9.4	2.5 J	230
BENZO(A)PYRENE	4.4 U	4.3 UJ	12.075	22 J	4.3 U	3.7 U	3.7 U	3.65 U	3.6 U	4 U	12	3.7 U	480
BENZO(B)FLUORANTHENE	4.4 U	4.3 UJ	20.075	38 J	8.7	3.7 U	3.7 U	3.65 U	3.6 U	260	19	3.7 U	400
BENZO(G,H,I)PERYLENE	4.4 U	4.3 UJ	8.075	14 J	4.3 U	4.1	3.7 U	3.65 U	3.6 U	50	3.8 U	6.2	370
BENZO(K)FLUORANTHENE	4.4 U	4.3 UJ	6.075	10 J	7.4	3.7 U	3.7 U	3.65 U	3.6 U	250	8.5	3.7 U	350
BIS(2-ETHYLHEXYL)PHTHALATE	440 U	430 U	435 U	440 U	430 U	370 U	370 U	365 U	360 U	54 J	380 U	370 U	110 J
BUTYL BENZYL PHTHALATE	440 U	430 U	435 U	440 U	430 U	370 U	370 U	365 U	360 U	400 U	380 U	370 U	410 UJ
CARBAZOLE	880 U	860 U	870 U	880 U	860 U	740 U	750 U	735 U	720 U	800 U	770 U	740 U	830 U
CHRYSENE	4.4 U	35	33	31	7.2	3.4 J	3.4 J	2.6	1.8 J	140	14	8.3	360
DIBENZO(A,H)ANTHRACENE	4.4 U	4.3 U	4.35 U	4.4 U	4.3 U	3.7 U	3.7 U	3.65 U	3.6 U	4 U	2.4 J	3.7 U	4.1 U
DIBENZOFURAN	440 U	55 J	48.5	42 J	430 U	370 U	370 U	365 U	360 U	34 J	380 U	370 U	120 J
FLUORANTHENE	1.9 U	80	68.5	57	12	3.7 U	3.7 U	3.65 U	3.6 U	340	33	6.8	830
FLUORENE	4.4 U	4.3 U	4.35 U	4.4 U	4.3 U	3.7 U	3.7 U	3.65 U	3.6 U	4 U	2.5 J	3.7 U	4.1 U
INDENO(1,2,3-CD)PYRENE	4.4 U	4.3 UJ	10.075	18 J	4.3 U	3.7 U	3.7 U	3.65 U	3.6 U	4 U	12	3.7 U	340
NAPHTHALENE	4.4 U	44	46.5	49	4.3 U	3.7 U	3.7 U	3.65 U	3.6 U	30	3.8 J	3.7 U	4600
PHENANTHRENE	4.4 U	190	190	190	2.2 J	1.8 J	2.3 J	2.3 J	3.6 U	310	24	4.2	740
PYRENE	4.4 U	70	62.5	55	12	3.7 U	3.7 U	3.65 U	3.6 U	260	26	6.9	700
PESTICIDES/PCBS (UG/KG)													
4,4'-DDD	0.89 U	0.87 U	0.88 U	0.89 U	0.87 U	0.75 U	0.75 U	0.735 U	0.72 U	0.81 U	0.77 U	0.75 U	330
4,4'-DDE	0.89 U	0.87 U	0.88 U	0.89 U	0.87 U	0.75 UJ	0.75 UJ	0.735 U	0.72 UJ	0.81 U	0.77 UJ	0.75 UJ	150
4,4'-DDT	0.89 UJ	0.87 UJ	0.88 U	0.89 UJ	0.87 UJ	0.75 UJ	0.75 UJ	0.735 U	0.72 UJ	0.81 UJ	0.77 UJ	0.75 UJ	62 J
ALDRIN	0.44 U	0.43 U	0.435 U	0.44 U	0.43 U	0.37 UJ	0.37 UJ	0.365 U	0.36 UJ	0.4 U	0.38 UJ	0.37 UJ	0.41 UJ
ALPHA-BHC	0.44 U	0.43 U	0.435 U	0.44 U	0.43 U	0.37 U	0.37 U	0.365 U	0.36 U	0.31 J	0.38 U	0.37 U	0.27 J
ALPHA-CHLORDANE	0.44 U	0.43 U	0.435 U	0.44 U	0.43 U	0.37 UJ	0.37 UJ	0.365 U	0.36 UJ	0.4 U	0.38 UJ	0.37 UJ	26 J
AROCLOR-1242	22.6 U	22 U	22.25 U	22.5 U	22 U	19 U	19 U	18.7 U	18.4 U	20.5 U	19.6 U	19 U	21.1 U
AROCLOR-1260	22.6 U	22 U	22.25 U	22.5 U	22 U	19 UJ	19 UJ	18.7 U	18.4 UJ	20.5 U	19.6 UJ	19 UJ	270 J
BETA-BHC	0.44 U	0.43 U	0.435 U	0.44 U	0.43 U	0.37 UJ	0.37 UJ	0.365 U	0.36 UJ	0.4 U	0.38 UJ	0.37 UJ	0.41 U
DELTA-BHC	0.44 U	0.43 U	0.435 U	0.44 U	0.43 U	0.37 UJ	0.37 UJ	0.365 U	0.36 UJ	0.25 J	0.38 UJ	0.37 UJ	0.41 U
DIELDRIN	0.89 U	0.87 U	0.88 U	0.89 U	0.87 U	0.75 UJ	0.75 UJ	0.735 U	0.72 UJ	0.81 U	0.77 UJ	0.75 UJ	3.2 J
ENDOSULFAN I	0.44 U	0.43 U	0.435 U	0.44 U	0.43 U	0.37 UJ	0.37 UJ	0.365 U	0.36 UJ	0.29 J	0.38 UJ	0.37 UJ	0.41 UJ
ENDOSULFAN II	0.89 U	0.87 U	0.88 U	0.89 U	0.87 U	0.75 UJ	0.75 UJ	0.735 U	0.72 UJ	0.81 U	0.77 UJ	0.75 UJ	0.65 J
ENDOSULFAN SULFATE	0.89 U	0.87 U	0.88 U	0.89 U	0.87 U	0.75 UJ	0.75 UJ	0.735 U	0.72 UJ	0.81 U	0.77 UJ	0.75 UJ	5.8 J
ENDRIN	0.89 UJ	0.87 UJ	0.88 U	0.89 UJ	0.87 UJ	0.75 UJ	0.75 UJ	0.735 U	0.72 U	0.81 UJ	0.77 UJ	0.75 UJ	0.83 UJ
ENDRIN ALDEHYDE	0.89 UJ	0.87 UJ	0.88 U	0.89 UJ	0.87 UJ	0.75 U	0.75 U	0.735 U	0.72 UJ	0.81 UJ	0.77 UJ	0.75 UJ	0.83 UJ
ENDRIN KETONE	0.89 U	0.87 U	0.88 U	0.89 U	0.87 U	0.75 UJ	0.75 UJ	0.735 U	0.72 UJ	0.81 U	0.77 UJ	0.75 UJ	0.83 UJ
GAMMA-BHC (LINDANE)	0.44 U	0.43 U	0.435 U	0.44 U	0.43 U	0.37 U	0.37 U	0.365 U	0.36 U	0.4 U	0.38 U	0.37 U	0.41 U
GAMMA-CHLORDANE	0.44 U	0.43 U	0.435 U	0.44 U	0.43 U	0.37 UJ	0.37 UJ	0.365 U	0.36 UJ	0.47 J	0.38 UJ	0.37 UJ	46 J
HEPTACHLOR EPOXIDE	0.44 U	0.43 U	0.435 U	0.44 U	0.43 U	0.37 UJ	0.37 UJ	0.365 U	0.36 UJ	0.26 J	0.38 UJ	0.37 UJ	6.9 J
METHOXYCHLOR	0.44 UJ	0.43 UJ	0.435 U	0.44 UJ	0.43 UJ	0.37 UJ	0.37 UJ	0.365 U	0.36 UJ	0.84 J	0.38 UJ	0.37 UJ	0.41 UJ

TABLE 4-8

SUMMARY OF POSITIVE DETECTIONS IN SUBSURFACE SOIL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	NTC21-SB-14	NTC21-SB-15			NTC21-SB-16	NTC21-SB-17	NTC21-SB-18			NTC21-SB-19	NTC21-SB-20	NTC21-SB-21	NTC21-SB-22
	2 to 4 (ft bgs)	2 to 4 (ft bgs)	NTC21SB15-SO-0204-	NTC21SB15-SO-0204-	2 to 4 (ft bgs)	5 to 7 (ft bgs)	5 to 7 (ft bgs)	NTC21SB18-SO-0507-	NTC21SB18-SO-0507-	2 to 4 (ft bgs)	4 to 6 (ft bgs)	6 to 8 (ft bgs)	2 to 4 (ft bgs)
HERBICIDES (UG/KG)													
2,4-D	66.4 UJ	64.8 U	65.5 U	66.2 U	64.6 U	55.8 U	56 U	55 U	54 U	60.2 U	57.7 U	55.8 U	62.2 U
DICAMBA	8.28 J	6.48 U	6.55 U	6.62 U	29.2 J	5.58 U	5.6 U	5.5 U	5.4 U	6.02 U	5.77 U	5.58 U	6.22 U
DIOXINS/FURANS (NG/KG)													
1,2,3,4,6,7,8,9-OCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8,9-OCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-HPCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HXCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HXCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HXCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HXCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HXCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HXCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PECDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-HXCDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,7,8-PECDF	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
METALS (MG/KG)													
ALUMINUM	16400	24300	22250	20200	18200	3720	4230	3860	3490	14500	8380	3770	5240
ANTIMONY	0.645 UJ	0.671 UJ	1.1705 U	1.67 UJ	0.595 U	0.534 U	0.569 U	0.543 U	0.517 U	0.602 UJ	0.577 U	0.581 U	1.64 UJ
ARSENIC	**9.51 J**	**85 J**	**104**	**123 J**	**9.1 J**	**12.5**	**8.65 J**	**15.925**	**23.2 J**	**9.59 J**	**8.39**	**5.7**	**5.69 J**
BARIUM	**119 J**	**157 J**	**177**	**197 J**	**99.5 J**	23.4 J	18.6 J	18.5	18.4 J	**105 J**	59.5 J	12.4 J	56.2 J
BERYLLIUM	1.16 J	**3.77 J**	**4.105**	**4.44 J**	1.27 J	0.244	0.266	0.2495	0.233	0.818 J	0.479	0.225	1.08 J
CADMIUM	**0.799**	**9.62**	**8.67**	**7.72**	**0.569**	0.175	0.153	0.2375	0.322	0.3	0.338	0.124	**0.809**
CALCIUM	6730 J	63600 J	91300	119000 J	4530 J	68400	79300	78900	78500	4280 J	55900	72300	26700 J
CHROMIUM	22.3 J	16.7 J	14.45	12.2 J	26.8 J	7.9	8.66	8.01	7.36	24 J	13.5	8.23	13 J
COBALT	**9.89**	**22 J**	**16.7**	**11.4 J**	**10.6**	**5.71**	**7.93**	**6.785**	**5.64**	**11.3**	**9.18**	**4.85**	**3.38**
COPPER	40.5 J	**110 J**	**97.15**	**84.3 J**	39.8 J	29.3	22.4	24.25	26.1	25.3 J	27.3	16	**57.2 J**
IRON	**34900 J**	**65800 J**	**88400**	**111000 J**	**34800 J**	**29400 J**	**21100 J**	**23450**	**25800 J**	**33200 J**	**21200 J**	**14300 J**	**31300 J**
LEAD	**21.4 J**	**19.9 J**	**18.85**	**17.8 J**	**21 J**	**19.6**	**14.6**	13.5	12.4	**16.6 J**	**28.6**	8.86	**102 J**
MAGNESIUM	4070	3860 J	7180	10500 J	4640	42600	48800	48800	48800	4910	36600	43300	9310
MANGANESE	**1200 J**	**1230 J**	**1125**	**1020 J**	**863 J**	**438**	**887**	**809.5**	**732**	**1190 J**	**803**	**568**	**263 J**
MERCURY	**0.0835**	0.0206	0.0236	0.0266	**0.0711 J**	0.0156	0.0151 U	0.012225	0.0169	**0.0627 J**	**0.0499**	0.0138	**0.251 J**
NICKEL	33 J	44.4 J	40.1	35.8 J	39.2 J	16.6	18.6	16.7	14.8	31.9 J	21.5	13.9	17.9 J
POTASSIUM	1430	1180	960	740	1930	864	936	813	690	1660	1010	834	600
SELENIUM	0.387 UJ	**1.31 J**	**1.495**	**1.68 J**	0.357 UJ	0.801 U	1.71 U	1.2425 U	0.775 U	0.902 UJ	0.866 U	1.16 U	0.982 UJ
SODIUM	801	1310	1220	1130	3370	984	347	348	349	1210	1470	241	1300
VANADIUM	28	21.4	19.8	18.2	26.9	11.5	12.9	13.4	13.9	25	19.5	11.2	15.8
ZINC	130 J	263 J	333.5	404 J	186 J	56.8	68	70.75	73.5	80.4 J	90.1	49.7	119 J

1 = United States Environmental Protection Agency (USEPA) Regions 3, 6, 9 Oakridge National Laboratory (ORNL) Risk-Based Soil Screening Level (SSL).
2 = Illinois Tiered Approach to Corrective Action Objectives (TACO); Soil Component of Groundwater Ingestion Class 1.
3 = USEPA Regions 3, 6, 9 ORNL Maximum Contaminant Level (MCL) Based SSL.
4 = Illinois Tiered Approach to Corrective Action Objectives (TACO); Soil Remediation Objectives Residential Ingestion.
5 = Illinois Tiered Approach to Corrective Action Objectives (Non-TACO); Soil Remediation Objectives Industrial/Commercial Construction Inhalation.

J = Value is estimated.
U = Analyte not detected at the reporting limit left of the letter.
UJ = Numerical detection limit for the undetected result is estimated.
mg/kg = Milligram per kilogram.
ug/kg = Microgram per kilogram.
ng/kg = Nanogram per kilogram.
NA = Not analyzed.
NC = No criteria.
Shaded cells and boldface font indicate that the concentration is greater than the minimum screening criterion.

.E 4-9

GROUNDWATER SCREENING CRITERIA
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	Illinois		USEPA	
	TACO Class I Groundwater Criteria	Non-TACO Class I Groundwater Criteria	MCL Criteria	Tapwater Criteria
Volatile Organics (ug/L)				
ACETONE	**6300**	NC	NC	22000
BENZENE	5	NC	5	**0.41**
CIS-1,2-DICHLOROETHENE	**70**	NC	**70**	370
METHYL TERT-BUTYL ETHER	70	NC	NC	**12**
TETRACHLOROETHENE	5	NC	5	**0.11**
TRICHLOROFLUOROMETHANE	NC	NC	NC	**1300**
Semivolatile Organics (ug/L)				
ACENAPHTHENE	**420**	NC	NC	2200
ANTHRACENE	**2100**	NC	NC	11000
BENZO(A)ANTHRACENE	0.13	NC	NC	**0.029**
BENZO(A)PYRENE	0.2	NC	0.2	**0.0029**
BENZO(B)FLUORANTHENE	0.18	NC	NC	**0.029**
BENZO(K)FLUORANTHENE	**0.17**	NC	NC	0.29
BIS(2-ETHYLHEXYL)PHTHALATE	6	NC	6	**4.8**
CHRYSENE	**1.5**	NC	NC	2.9
FLUORANTHENE	**280**	NC	NC	1500
FLUORENE	**280**	NC	NC	1500
PENTACHLOROPHENOL	1	NC	1	**0.56**
PYRENE	**210**	NC	NC	1100
Pesticides/PCBs (ug/L)				
ALPHA-CHLORDANE	NC	NC	2	**0.19**
DELTA-BHC	NC	NC	NC	**0.011**
GAMMA-CHLORDANE	NC	NC	2	**0.19**
Herbicides (ug/L)				
2,4,5-TP (SILVEX)	**50**	NC	**50**	290
2,4-DB	NC	NC	NC	**290**
DALAPON	**200**	NC	**200**	1100
DICHLOROPROP	NC	NC	NC	NC
Metals (ug/L)				
ALUMINUM	NC	**3500**	NC	37000
ARSENIC	50	NC	10	**0.045**
BARIUM	**2000**	NC	**2000**	7300
CADMIUM	**5**	NC	**5**	18
CALCIUM	NC	NC	NC	NC
CHROMIUM	**100**	NC	**100**	NC
COBALT	1000	NC	NC	**11**
COPPER	**650**	NC	1300	1500
IRON	**5000**	**5000**	NC	26000
LEAD	**7.5**	NC	15	NC
MAGNESIUM	NC	NC	NC	NC
MANGANESE	**150**	NC	NC	880
NICKEL	**100**	NC	NC	730
POTASSIUM	NC	NC	NC	NC
SELENIUM	**50**	NC	**50**	180
SILVER	**50**	NC	NC	180
SODIUM	NC	NC	NC	NC
VANADIUM	**49**	NC	NC	180
ZINC	**5000**	NC	NC	11000
Dissolved Metals (ug/L)				
ARSENIC	50	NC	10	**0.045**
BARIUM	**2000**	NC	**2000**	7300
CADMIUM	**5**	NC	**5**	18
CALCIUM	NC	NC	NC	NC
IRON	**5000**	**5000**	NC	26000
MAGNESIUM	NC	NC	NC	NC
MANGANESE	**150**	NC	NC	880
NICKEL	**100**	NC	NC	730
POTASSIUM	NC	NC	NC	NC
SODIUM	NC	NC	NC	NC
ZINC	**5000**	NC	NC	11000

mg/L= Milligram per liter.
ug/L = Microgram per liter.
NC = No criteria.
USEPA = United States Environmental Protection Agency.
TACO = Illinois Tiered Approach to Corrective Action Objectives.

TABLE 4-10

OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN GROUNDWATER
SITE 21 - BUILDINGS 1517/1506 AREA
GREAT LAKES NAVAL STATION
GREAT LAKES, ILLINOIS

Parameter	Frequency of Detection	Minimum Result	Maximum Result	Sample of Maximum Detection	Minimum Non-Detection	Maximum Non-Detection	Average Positive Result	Overall Average	Standard Deviation	Minimum Regulatory Screening Value		Illinois TACO Class I Groundwater Criteria		Illinois Non-TACO Class I Groundwater Criteria		USEPA MCL Criteria		USEPA Tapwater Criteria	
										Criteria	Exceedances	Criteria	Exceedances	Criteria	Exceedances	Criteria	Exceedances	Criteria	Exceedances
Volatile Organics (ug/L)																			
ACETONE	5/6	1.8 J	4.6 J	NTC21-MW-02-01	0.84	0.84	3.12E+00	2.67E+00	1.49E+00	6300	0	6300	0	NC	0	NC	0	22000	0
BENZENE	1/6	0.96 J	0.96 J	NTC21-MW-01-01	0.11	0.11	9.60E-01	2.06E-01	3.69E-01	0.41	1	5	0	NC	0	5	0	0.41	1
CIS-1,2-DICHLOROETHENE	1/6	0.79 J	0.79 J	NTC21-MW-05-01	0.13	0.13	7.90E-01	1.86E-01	2.96E-01	70	0	70	0	NC	0	70	0	370	0
METHYL TERT-BUTYL ETHER	1/6	1.6	1.6	NTC21-MW-01-01	0.1	0.1	1.60E+00	3.08E-01	6.33E-01	12	0	70	0	NC	0	NC	0	12	0
TETRACHLOROETHENE	1/6	0.85 J	0.85 J	NTC21-MW-01-01	0.15	0.15	8.50E-01	2.04E-01	3.16E-01	0.11	1	5	0	NC	0	5	0	0.11	1
TRICHLOROFLUOROMETHANE	1/6	2.5	2.5	NTC21-MW-01-01	0.17	0.17	2.50E+00	4.88E-01	9.86E-01	1300	0	NC	0	NC	0	NC	0	1300	0
Semivolatile Organics (ug/L)																			
ACENAPHTHENE	2/6	0.02	0.02	NTC21-MW-05-01	0.01	0.1	2.00E-02	1.92E-02	1.63E-02	420	0	420	0	NC	0	NC	0	2200	0
				NTC21-MW-03-01	0.01	0.1	2.00E-02	1.92E-02	1.63E-02	420	0	420	0	NC	0	NC	0	2200	0
ANTHRACENE	2/6	0.03 J	0.04 J	NTC21-MW-03-01	0.01	0.03	3.50E-02	1.83E-02	1.37E-02	2100	0	2100	0	NC	0	NC	0	11000	0
BENZO(A)ANTHRACENE	2/6	0.04 J	0.05 J	NTC21-MW-03-01	0.01	0.05	4.50E-02	2.33E-02	1.83E-02	0.029	2	0.13	0	NC	0	NC	0	0.029	2
BENZO(A)PYRENE	2/6	0.03 J	0.03 J	NTC21-MW-05-01 NTC21-MW-03-01	0.01	0.03	3.00E-02	1.67E-02	1.08E-02	0.0029	2	0.2	0	NC	0	0.2	0	0.0029	2
BENZO(B)FLUORANTHENE	2/6	0.03 J	0.03 J	NTC21-MW-05-01 NTC21-MW-03-01	0.01	0.04	3.00E-02	1.75E-02	1.08E-02	0.029	2	0.18	0	NC	0	NC	0	0.029	2
BENZO(K)FLUORANTHENE	2/6	0.03 J	0.03 J	NTC21-MW-05-01 NTC21-MW-03-01	0.01	0.04	3.00E-02	1.75E-02	1.08E-02	0.17	0	0.17	0	NC	0	NC	0	0.29	0
BIS(2-ETHYLHEXYL)PHTHALATE	1/6	1.8 J	1.8 J	NTC21-MW-03-01	1.2	1.2	1.80E+00	8.00E-01	4.90E-01	4.8	0	6	0	NC	0	6	0	4.8	0
CHRYSENE	2/6	0.04 J	0.05 J	NTC21-MW-03-01	0.01	0.06	4.50E-02	2.42E-02	1.86E-02	1.5	0	1.5	0	NC	0	NC	0	2.9	0
FLUORANTHENE	3/6	0.03 J	0.06	NTC21-MW-05-01	0.01	0.13	4.33E-02	3.75E-02	2.25E-02	280	0	280	0	NC	0	NC	0	1500	0
FLUORENE	2/6	0.02 J	0.03 J	NTC21-MW-03-01	0.01	0.04	2.50E-02	1.58E-02	9.17E-03	280	0	280	0	NC	0	NC	0	1500	0
PENTACHLOROPHENOL	1/6	7.8 J	7.8 J	NTC21-MW-01-01	0.92	0.98	7.80E+00	1.70E+00	2.99E+00	0.56	1	1	1	NC	0	1	1	0.56	1
PYRENE	3/6	0.03 J	0.05 J	NTC21-MW-03-01 NTC21-MW-05-01	0.01	0.12	4.33E-02	3.75E-02	1.99E-02	210	0	210	0	NC	0	NC	0	1100	0
Pesticides/PCBs (ug/L)																			
ALPHA-CHLORDANE	1/6	0.00385 J	0.00385 J	NTC21-MW-05-01	0.00317	0.00324	3.85E-03	1.99E-03	9.13E-04	0.19	0	NC	0	NC	0	2	0	0.19	0
DELTA-BHC	2/6	0.00801 J	0.02	NTC21-MW-06-01	0.00317	0.00324	1.40E-02	5.74E-03	7.44E-03	0.011	1	NC	0	NC	0	NC	0	0.011	1
GAMMA-CHLORDANE	1/6	0.00311 J	0.00311 J	NTC21-MW-05-01	0.00317	0.00324	3.11E-03	1.86E-03	6.11E-04	0.19	0	NC	0	NC	0	2	0	0.19	0
Herbicides (ug/L)																			
2,4,5-TP (SILVEX)	1/6	0.03 J	0.03 J	NTC21-MW-01-01	0.02	0.02	3.00E-02	1.33E-02	8.16E-03	50	0	50	0	NC	0	50	0	290	0
2,4-DB	1/6	0.62 J	0.62 J	NTC21-MW-01-01	0.24	0.24	6.20E-01	2.03E-01	2.04E-01	290	0	NC	0	NC	0	NC	0	290	0
DALAPON	1/6	0.75 J	0.75 J	NTC21-MW-01-01	0.61	0.61	7.50E-01	3.79E-01	1.82E-01	200	0	200	0	NC	0	200	0	1100	0
DICHLOROPROP	3/6	0.34 J	0.78 J	NTC21-MW-05-01	0.24	0.24	5.40E-01	3.30E-01	2.70E-01	NC	0	NC	0	NC	0	NC	0	NC	0
Metals (ug/L)																			
ALUMINUM	5/6	122	668 J	NTC21-MW-02-01	25	25	2.98E+02	2.50E+02	2.29E+02	3500	0	NC	0	3500	0	NC	0	37000	0
ARSENIC	5/6	0.88 J	7.26 J	NTC21-MW-02-01	0.75	0.75	2.80E+00	2.40E+00	2.49E+00	0.045	5	50	0	NC	0	10	0	0.045	5
BARIUM	6/6	32.3	422	NTC21-MW-05-01	---	---	1.27E+02	1.27E+02	1.51E+02	2000	0	2000	0	NC	0	2000	0	7300	0
CADMIUM	6/6	0.69	3.45	NTC21-MW-05-01	---	---	1.34E+00	1.34E+00	1.06E+00	5	0	5	0	NC	0	5	0	18	0
CALCIUM	6/6	96600	671000	NTC21-MW-02-01	---	---	3.18E+05	3.18E+05	2.37E+05	NC	0	NC	0	NC	0	NC	0	NC	0
CHROMIUM	1/6	4.13	4.13	NTC21-MW-01-01	0.5	2.5	4.13E+00	1.08E+00	1.54E+00	100	0	100	0	NC	0	100	0	NC	0
COBALT	3/6	3.55	15.3	NTC21-MW-02-01	1.25	1.25	7.83E+00	4.23E+00	5.70E+00	11	1	1000	0	NC	0	NC	0	11	1
COPPER	1/6	4.25 J	4.25 J	NTC21-MW-01-01	1.25	1.25	4.25E+00	1.23E+00	1.48E+00	650	0	650	0	NC	0	1300	0	1500	0
IRON	6/6	22.3	34000	NTC21-MW-02-01	---	---	6.27E+03	6.27E+03	1.36E+04	5000	1	5000	1	5000	1	NC	0	26000	1
LEAD	1/6	0.83	0.83	NTC21-MW-06-01	0.75	9.38	8.30E-01	1.61E+00	1.59E+00	7.5	0	7.5	0	NC	0	15	0	NC	0
MAGNESIUM	6/6	608	125000	NTC21-MW-05-01	---	---	5.79E+04	5.79E+04	4.66E+04	NC	0	NC	0	NC	0	NC	0	NC	0
MANGANESE	6/6	0.89	5400	NTC21-MW-05-01	---	---	1.80E+03	1.80E+03	2.17E+03	150	4	150	4	NC	0	NC	0	880	3
NICKEL	5/6	0.75	11.3	NTC21-MW-02-01	0.75	0.75	3.26E+00	2.78E+00	4.21E+00	100	0	100	0	NC	0	NC	0	730	0
POTASSIUM	6/6	2980	40200 J	NTC21-MW-01-01	---	---	1.37E+04	1.37E+04	1.37E+04	NC	0	NC	0	NC	0	NC	0	NC	0
SELENIUM	1/6	1.63	1.63	NTC21-MW-01-01	0.75	7.5	1.63E+00	2.08E+00	1.45E+00	50	0	50	0	NC	0	50	0	180	0
SILVER	2/6	0.47 J	1.3	NTC21-MW-05-01	0.25	0.25	8.85E-01	3.78E-01	4.72E-01	50	0	50	0	NC	0	NC	0	180	0
SODIUM	6/6	55700	1040000	NTC21-MW-05-01	---	---	5.94E+05	5.94E+05	3.48E+05	NC	0	NC	0	NC	0	NC	0	NC	0
VANADIUM	1/6	4.36	4.36	NTC21-MW-01-01	1.25	1.25	4.36E+00	1.25E+00	1.52E+00	49	0	49	0	NC	0	NC	0	180	0
ZINC	2/6	1.5	2.83	NTC21-MW-06-01	1.25	31.2	2.17E+00	4.99E+00	5.54E+00	5000	0	5000	0	NC	0	NC	0	11000	0

TABLE 4-10

OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN GROUNDWATER
SITE 21 - BUILDINGS 1517/1506 AREA
GREAT LAKES NAVAL STATION
GREAT LAKES, ILLINOIS

Parameter	Frequency of Detection	Minimum Result	Maximum Result	Sample of Maximum Detection	Minimum Non-Detection	Maximum Non-Detection	Average Positive Result	Overall Average	Standard Deviation	Minimum Criteria Value		TACO Class I Groundwater Criteria		Non-TACO Class I Groundwater Criteria		USEPA MCL Criteria		USEPA Tapwater Criteria	
										Criteria	Exceedances	Criteria	Exceedances	Criteria	Exceedances	Criteria	Exceedances	Criteria	Exceedances
Dissolved Metals (ug/L)																			
ARSENIC	1/1	**1.16**	**1.16**	NTC21-MW-04-01	---	---	1.16E+00	1.16E+00	---	**0.045**	**1**	50	0	NC	0	10	0	**0.045**	**1**
BARIUM	1/1	32.4	32.4	NTC21-MW-04-01	---	---	3.24E+01	3.24E+01	---	2000	0	2000	0	NC	0	2000	0	7300	0
CADMIUM	1/1	0.68	0.68	NTC21-MW-04-01	---	---	6.80E-01	6.80E-01	---	5	0	5	0	NC	0	5	0	18	0
CALCIUM	1/1	122000	122000	NTC21-MW-04-01	---	---	1.22E+05	1.22E+05	---	NC	0	NC	0	NC	0	NC	0	NC	0
IRON	1/1	478	478	NTC21-MW-04-01	---	---	4.78E+02	4.78E+02	---	5000	0	5000	0	5000	0	NC	0	26000	0
MAGNESIUM	1/1	54200	54200	NTC21-MW-04-01	---	---	5.42E+04	5.42E+04	---	NC	0	NC	0	NC	0	NC	0	NC	0
MANGANESE	1/1	**161**	**161**	NTC21-MW-04-01	---	---	1.61E+02	1.61E+02	---	**150**	**1**	**150**	**1**	NC	0	NC	0	880	0
NICKEL	1/1	1.7	1.7	NTC21-MW-04-01	---	---	1.70E+00	1.70E+00	---	100	0	100	0	NC	0	NC	0	730	0
POTASSIUM	1/1	3360	3360	NTC21-MW-04-01	---	---	3.36E+03	3.36E+03	---	NC	0	NC	0	NC	0	NC	0	NC	0
SODIUM	1/1	57100	57100	NTC21-MW-04-01	---	---	5.71E+04	5.71E+04	---	NC	0	NC	0	NC	0	NC	0	NC	0
ZINC	1/1	1.32	1.32	NTC21-MW-04-01	---	---	1.32E+00	1.32E+00	---	5000	0	5000	0	NC	0	NC	0	11000	0

J = Estimated value.
ug/L = Microgram per liter.
NC = No criteria.
USEPA = United States Environmental Protection Agency.
TACO = Tiered Approach to Corrective Action Objectives.

Shaded cells and boldface font indicate that the concentration is greater than the minimum regulatory screening values.

4-11

SUMMARY OF POSITIVE DETECTIONS IN GROUNDWATER
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	Minimum Regulatory Screening Value		NTC21MW01	NTC21MW02	NTC21MW03	NTC21MW04	NTC21MW05	NTC21MW06
	Value	Source						
VOLATILES (UG/L)								
ACETONE	6300	TACO 3	3.6 J	4.6 J	0.84 UJ	2.2 J	3.4 J	1.8 J
BENZENE	0.41	USEPA 1	**0.96 J**	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
CIS-1,2-DICHLOROETHENE	70	USEPA 2	0.13 U	0.13 U	0.13 U	0.13 U	0.79 J	0.13 U
METHYL TERT-BUTYL ETHER	12	USEPA 1	1.6	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
TETRACHLOROETHENE	0.11	USEPA 1	**0.85 J**	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
TRICHLOROFLUOROMETHANE	1300	USEPA 1	2.5	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
SEMIVOLATILES (UG/L)								
ACENAPHTHENE	420	TACO 3	0.1 U	0.01 U	0.02 J	0.02 U	0.02 J	0.02 U
ACENAPHTHYLENE	210	Non-TACO 4	0.02 U	0.01 U	0.01 U	0.02 U	0.01 U	0.02 U
ANTHRACENE	2100	TACO 3	0.02 U	0.01 U	0.04 J	0.02 U	0.03 J	0.03 U
BENZO(A)ANTHRACENE	0.029	USEPA 1	0.02 U	0.01 U	**0.05 J**	0.02 U	**0.04 J**	0.05 U
BENZO(A)PYRENE	0.0029	USEPA 1	0.02 U	0.01 U	**0.03 J**	0.02 U	**0.03 J**	0.03 U
BENZO(B)FLUORANTHENE	0.029	USEPA 1	0.02 U	0.01 U	**0.03 J**	0.02 U	**0.03 J**	0.04 U
BENZO(K)FLUORANTHENE	0.17	TACO 3	0.02 U	0.01 U	0.03 J	0.02 U	0.03 J	0.04 U
BIS(2-ETHYLHEXYL)PHTHALAT	4.8	USEPA 1	1.2 U	1.2 U	1.8 J	1.2 U	1.2 U	1.2 U
CHRYSENE	1.5	TACO 3	0.02 U	0.01 U	0.05 J	0.02 U	0.04 J	0.06 U
FLUORANTHENE	280	TACO 3	0.13 U	0.01 U	0.04 J	0.03 J	0.06	0.05 U
FLUORENE	280	TACO 3	0.04 U	0.01 U	0.03 J	0.02 U	0.02 J	0.02 U
PENTACHLOROPHENOL	0.56	USEPA 1	**7.8 J**	0.92 U	0.96 U	0.98 U	0.92 U	0.98 U
PYRENE	210	TACO 3	0.12 U	0.01 U	0.05 J	0.03 J	0.05	0.06 U
PESTICIDES/PCBS (UG/L)								
ALPHA-CHLORDANE	0.19	USEPA 1	0.0032 U	0.0032 U	0.0032 U	0.0032 U	0.0039 J	0.003 U
DELTA-BHC	0.011	USEPA 1	0.0032 U	0.0032 U	0.0032 U	0.0032 U	0.008 J	**0.02**
GAMMA-CHLORDANE	0.19	USEPA 1	0.0032 U	0.0032 U	0.0032 U	0.0032 U	0.0031 J	0.003 U
HERBICIDES (UG/L)								
2,4,5-TP (SILVEX)	50	USEPA 2	0.03 J	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
2,4-DB	290	USEPA 1	0.62 J	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
DALAPON	200	USEPA 2	0.75 J	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U
DICHLOROPROP	NC	N/A	0.24 U	0.5 J	0.34 J	0.24 U	0.78 J	0.24 U
METALS (UG/L)								
ALUMINUM	3500	Non-TACO 4	252	668 J	303	122	145	25 U
ARSENIC	0.045	USEPA 1	**1.88 J**	**7.26 J**	**0.88 J**	**1.6**	**2.39**	0.75 U
BARIUM	2000	USEPA 2	123	34.5	33.1	32.3	422	118
CADMIUM	5	USEPA 2	0.79	0.86	1.34	0.69	3.45	0.92
CALCIUM	NC	N/A	96600	671000	504000	121000	374000	1E+05
CHROMIUM	100	USEPA 2	4.13	0.75 U	0.5 U	0.5 U	2.5 U	0.5 U
COBALT	11	USEPA 1	1.25 U	**15.3**	3.55	1.25 U	4.65	1.25 U
COPPER	650	TACO 3	4.25 J	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U
IRON	5000	TACO 3	22.3	**34000**	2610	752	173	38.3
LEAD	7.5	TACO 3	1.88 U	9.38 UJ	3.75 U	0.75 U	1.88 U	0.83
MAGNESIUM	NC	N/A	608	97600	20500	54000	125000	49400
MANGANESE	150	TACO 3	0.89	**3040**	**2150**	**168**	**5400**	61.3
NICKEL	100	TACO 3	0.75	11.3	0.89	1.52	1.84	0.75 U
POTASSIUM	NC	N/A	40200 J	13100 J	11100 J	3440	11600	2980
SELENIUM	50	USEPA 2	1.63	6.25 U	7.5 U	1 U	6.25 U	0.75 U
SILVER	50	TACO 3	0.25 U	0.47 J	0.25 U	0.25 U	1.3	0.25 U
SODIUM	NC	N/A	698000	772000	667000	55700	1E+06	3E+05
VANADIUM	49	TACO 3	4.36	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U
ZINC	5000	TACO 3	1.25 U	31.2 U	12.5 U	1.5	6.25 U	2.83
DISSOLVED METALS (UG/L)								
ARSENIC	0.045	USEPA 1	NA	NA	NA	**1.16**	NA	NA
BARIUM	2000	USEPA 2	NA	NA	NA	32.4	NA	NA
CADMIUM	5	USEPA 2	NA	NA	NA	0.68	NA	NA
CALCIUM	NC	N/A	NA	NA	NA	122000	NA	NA
IRON	5000	TACO 3	NA	NA	NA	478	NA	NA
MAGNESIUM	NC	N/A	NA	NA	NA	54200	NA	NA
MANGANESE	150	TACO 3	NA	NA	NA	**161**	NA	NA
NICKEL	100	TACO 3	NA	NA	NA	1.7	NA	NA
POTASSIUM	NC	N/A	NA	NA	NA	3360	NA	NA
SODIUM	NC	N/A	NA	NA	NA	57100	NA	NA
ZINC	5000	TACO 3	NA	NA	NA	1.32	NA	NA

1 = United States Envinronmental Protection Agency (USEPA) Regions 3, 6, 9 Oakridge National Laboratory (ORNL) Screening Level for Tap Water.
2 = USEPA Maximum Contaminant Level (MCL) Groundwater/Surface Water
3 = Illinois Tiered Approach to Corrective Action Objectives (TACO); Groundwater Remediation Objective Ingestion Class 1.
4 = Illinois Tiered Approach to Corrective Action Objectives (Non-TACO); Groundwater Remediation Objective Ingestion Class 1.
J = Value is estimated.
U = Analyte not detected at the reporting limit left of the letter.
UJ = Numerical detection limit for the undetected result is estimated.
mg/L= Milligram per liter.
ug/L = Microgram per liter.
NA = Not analyzed.
NC = No criteria.
Shaded cells and boldface font indicate that the concentration is greater than the minimum regulatory screening value.

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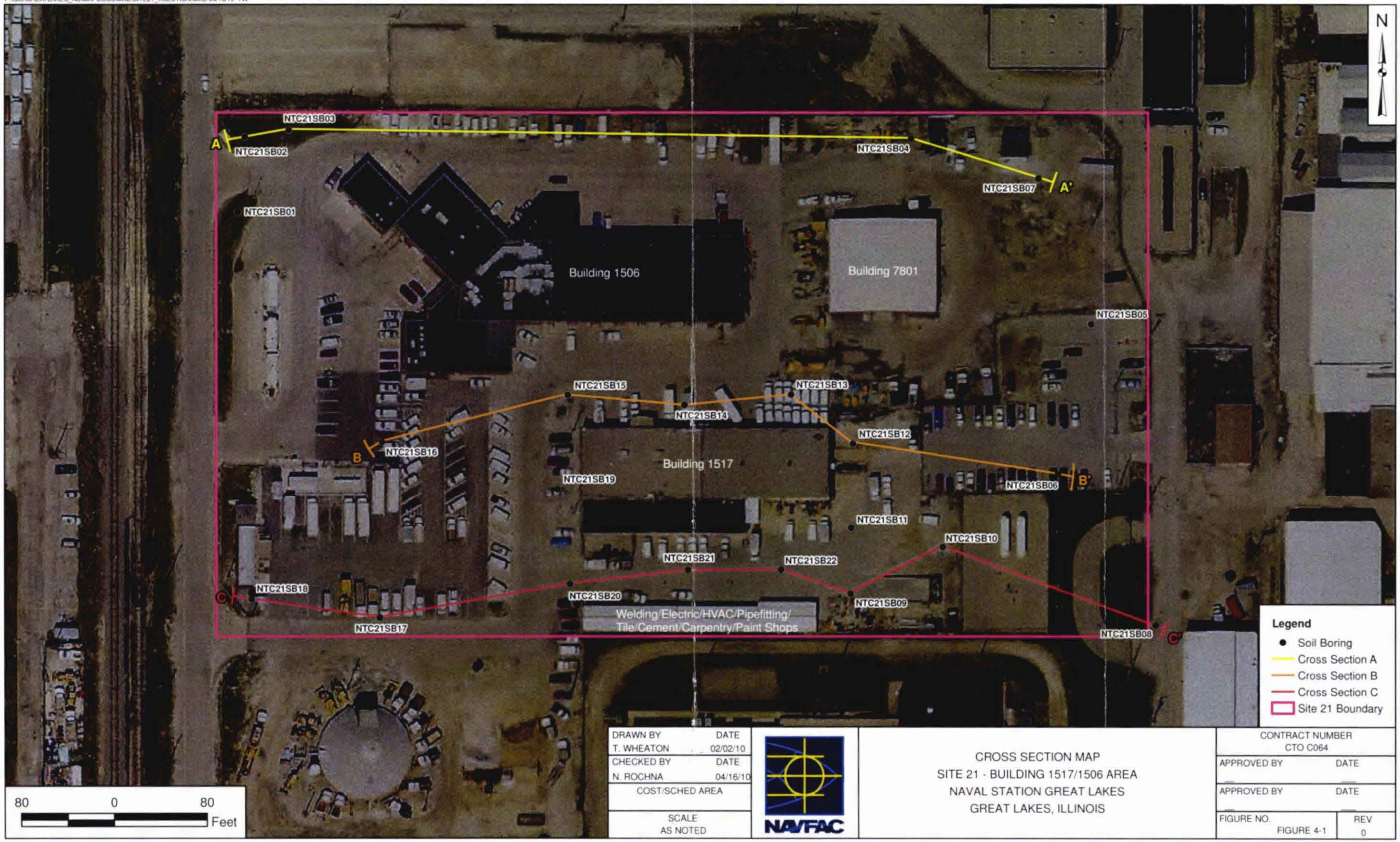
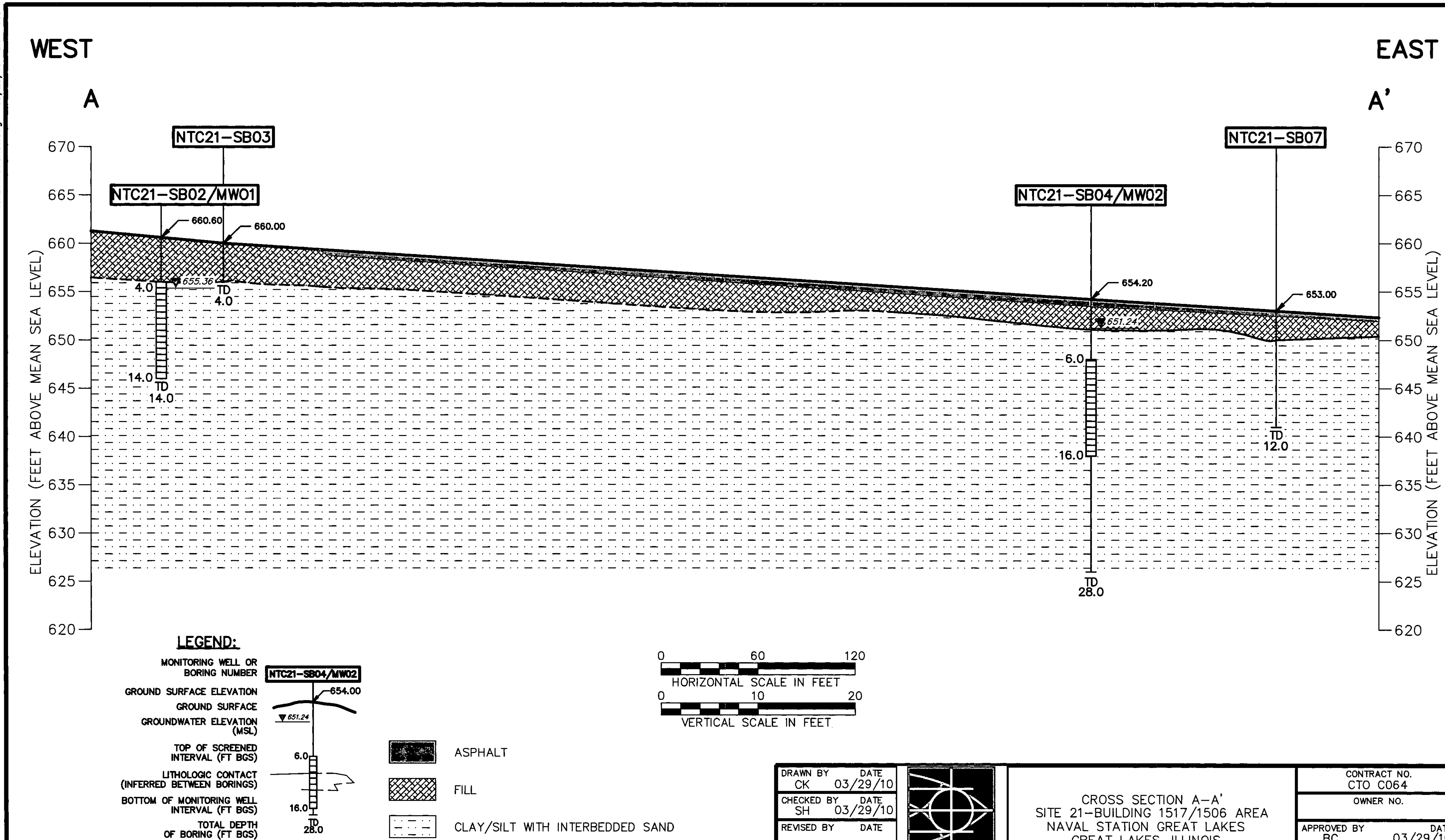
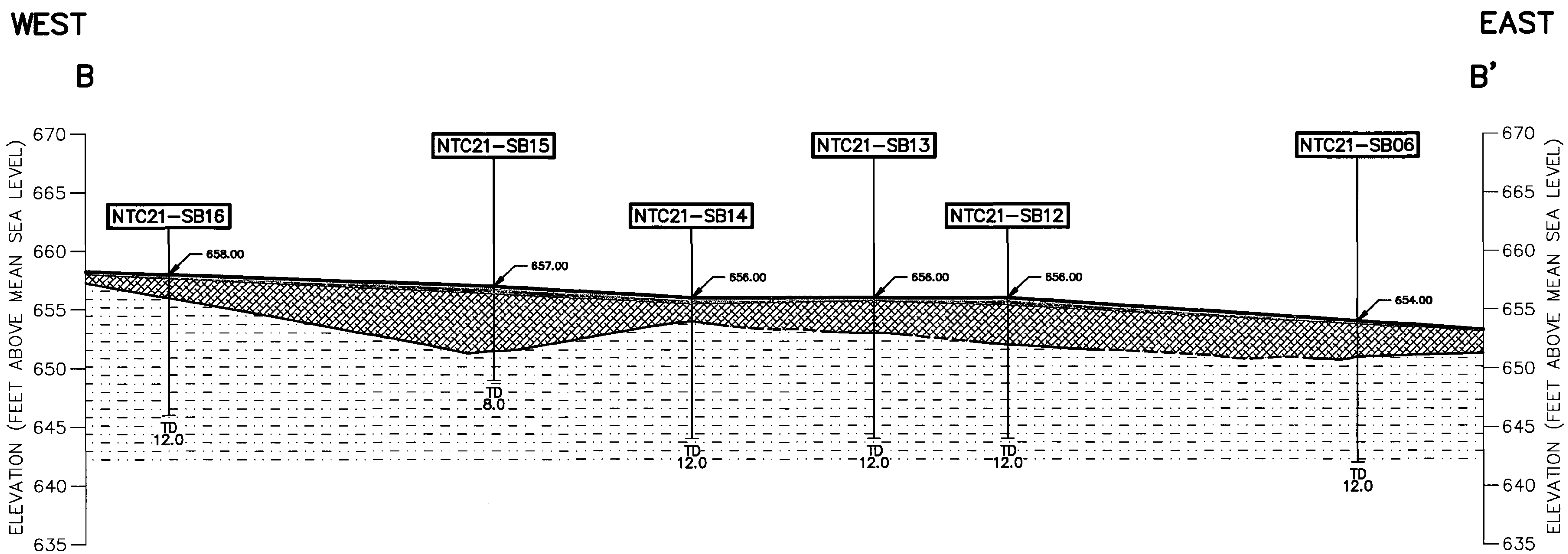
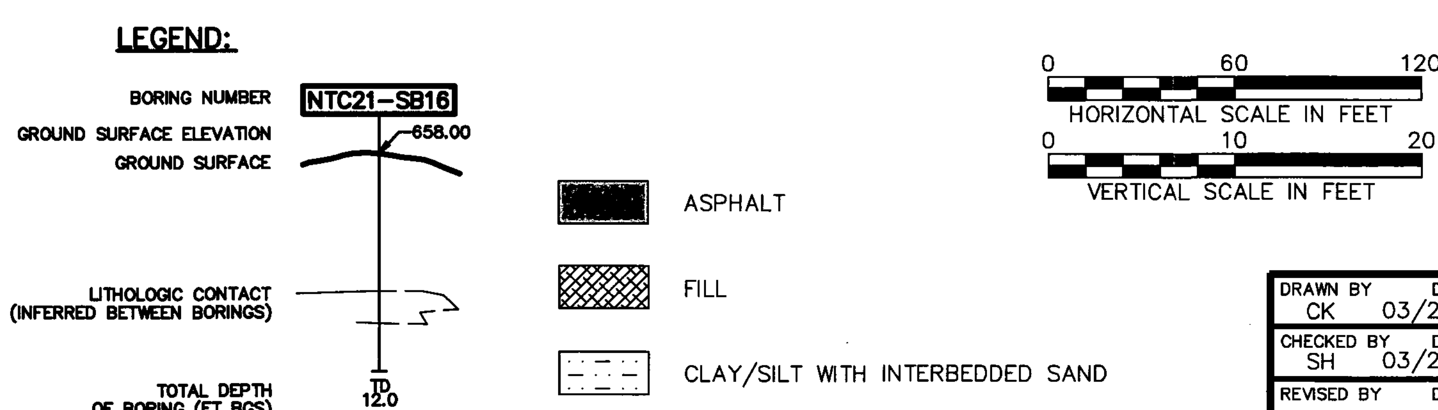




DRAWN BY CK / DATE 03/29/10	NAVFAC	CROSS SECTION A–A' SITE 21–BUILDING 1517/1506 AREA NAVAL STATION GREAT LAKES GREAT LAKES, ILLINOIS	CONTRACT NO. CTO C064
CHECKED BY SH / DATE 03/29/10			OWNER NO.
REVISED BY / DATE			APPROVED BY BC / DATE 03/29/10
SCALE AS NOTED			DRAWING NO. FIGURE 4–2 / REV. 0

ACAD:1797CX02.dwg 03/29/10 CK PIT





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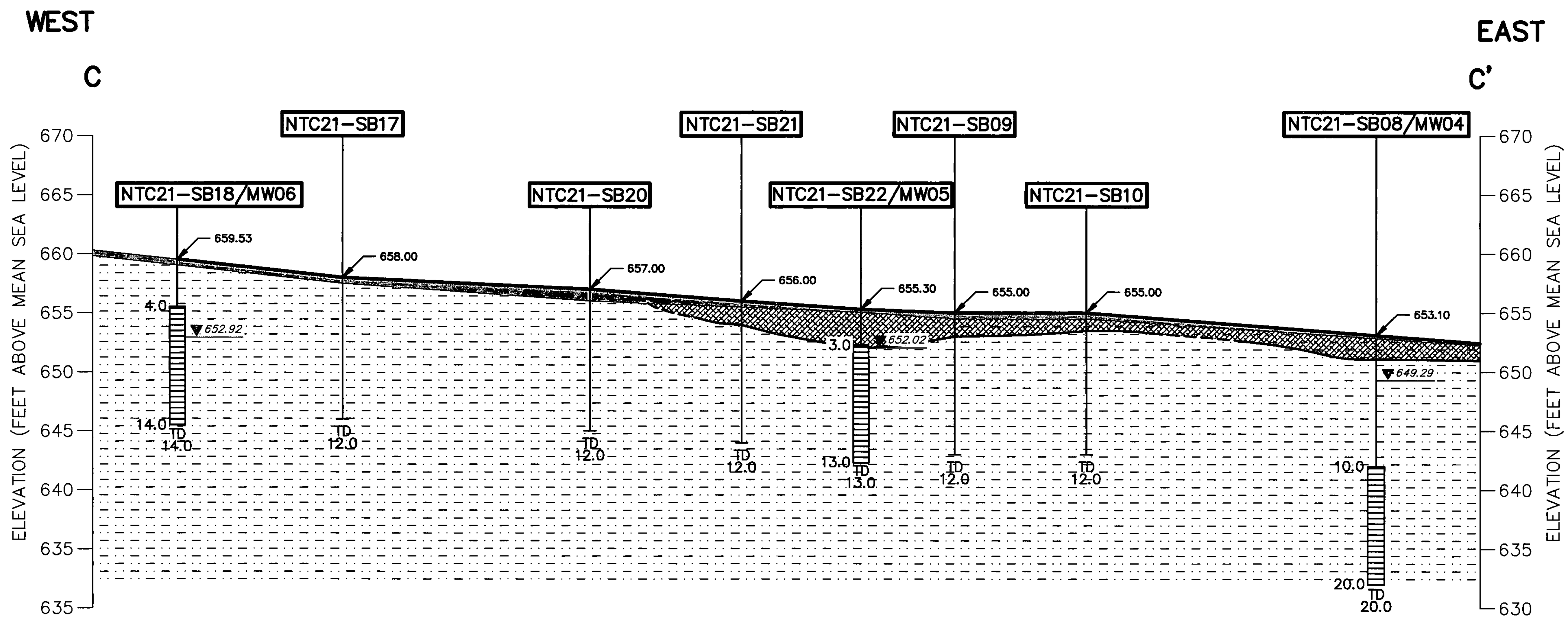
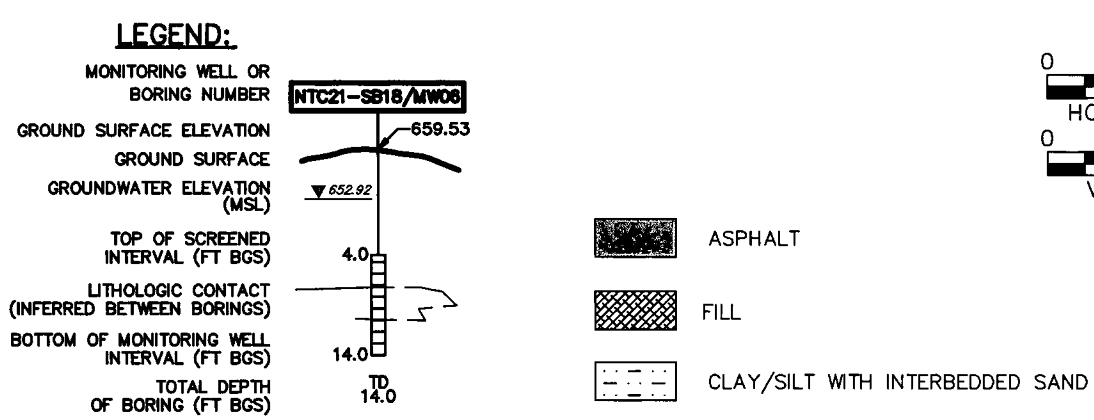
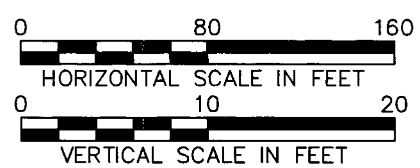
CHECKED BY SH — DATE 03/29/10			OWNER NO.
REVISED BY — DATE			APPROVED BY BC — DATE 03/29/10
SCALE AS NOTED			DRAWING NO. FIGURE 4-3 — REV. 0

ACAD:1797CX03.dwg 03/29/10 CK PIT







DRAWN BY CK DATE 03/29/10	NAVFAC	CROSS SECTION C-C' SITE 21 BUILDING 1517/1506 AREA NAVEL STATION GREAT LAKES GREAT LAKES, ILLINOIS	CONTRACT NO. CTO C064
CHECKED BY SH DATE 03/29/10			OWNER NO.
REVISED BY DATE			APPROVED BY BC DATE 03/29/10
SCALE AS NOTED			DRAWING NO. FIGURE 4-4 REV. 0

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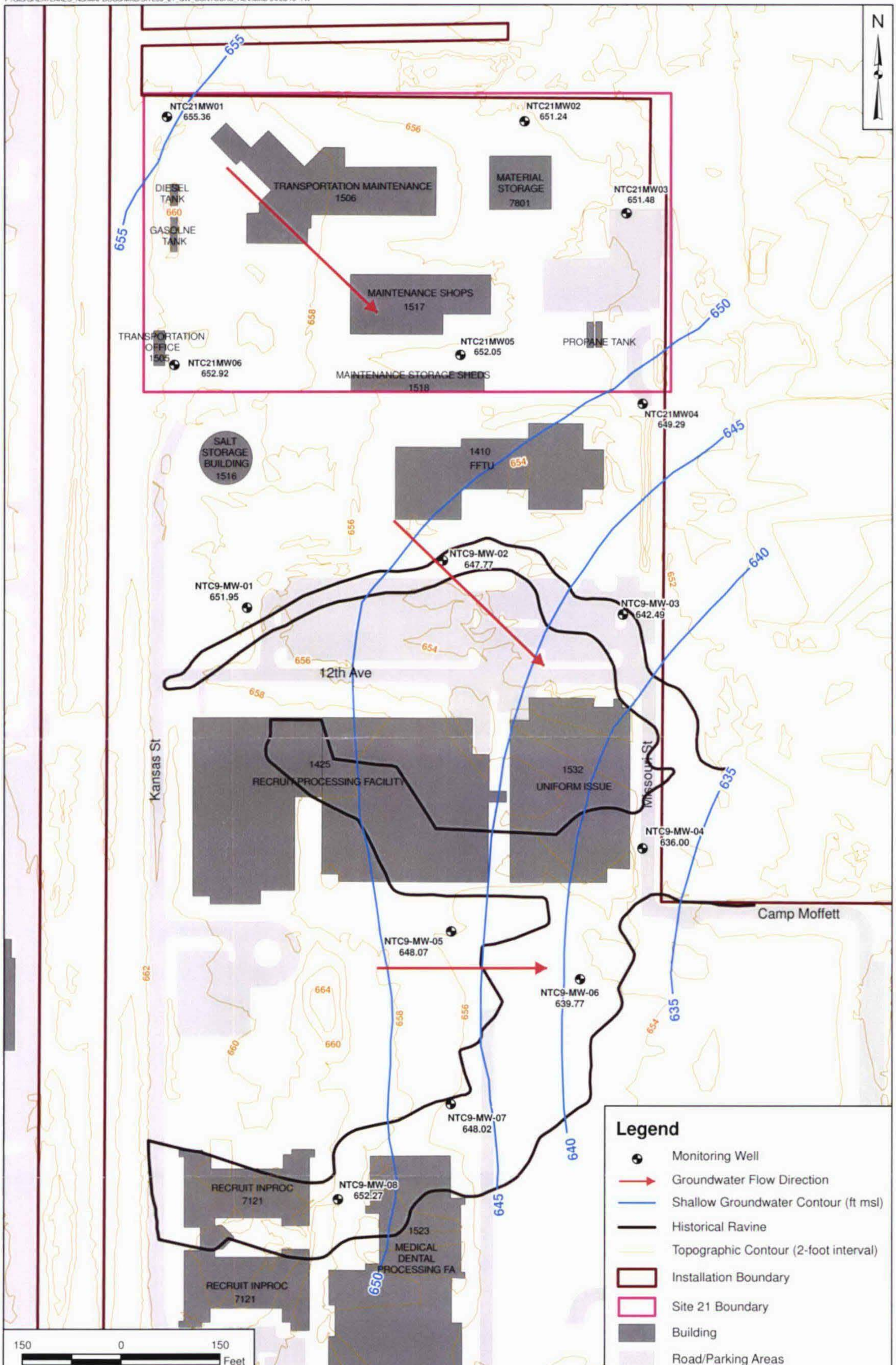

DRAWN BY	DATE
K. MOORE	01/29/09
CHECKED BY	DATE
S. HILL	04/06/10
REVISED BY	DATE
T. WHEATON	04/06/10
SCALE AS NOTED	

NAVFAC

SHALLOW GROUNDWATER CONTOURS
SITES 9 - CAMP MOFFET AND SITE 21 - BUILDING 1517 / 1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER CTO C064	
APPROVED BY	DATE
B. CUMMINGS	04/06/10
APPROVED BY	DATE
FIGURE NO. FIGURE 4-5	REV 0

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NOTES:
1. Results are expressed in micrograms per kilogram (ug/kg)
2. J = Estimated value
3. [0-1] = Depth interval ft-bgs that sample was collected from
4. Values shown exceed Minimum Screening Criteria. The Minimum Screening Criteria was derived from the following:
TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values
Non-TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values; and/or,
USEPA - Risk Based SSLs, Inhalation SSLs, and Residential Soil screening values.

DRAWN BY: K. MOORE	DATE: 02/11/10	NAVFAC	VOC CONCENTRATIONS EXCEEDING MINIMUM REGULATORY SCREENING VALUES IN SURFACE SOIL SITE 21 - BUILDINGS 1517/1506 AREA NAVAL STATION GREAT LAKES GREAT LAKES, ILLINOIS	CONTRACT NUMBER: CTO C064
CHECKED BY: N. ROCHNA	DATE: 01/27/11			APPROVED BY: B. CUMMINGS / DATE:
COST/SCHED AREA				APPROVED BY / DATE
SCALE: AS NOTED				FIGURE NO.: FIGURE 4-6 / REV: 0

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NOTES:
1. Results are expressed in micrograms per kilogram (ug/kg)
2. J = Estimated value
3. [0-1] = Depth interval ft-bgs that sample was collected from
4. Values shown exceed Minimum Screening Criteria. The Minimum Screening Criteria was derived from the following:
TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values
Non-TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values; and/or,
USEPA - Risk Based SSLs, Inhalation SSLs, and Residential Soil screening values.

DRAWN BY K. MOORE	DATE 02/11/10	NAVFAC	SVOC CONCENTRATIONS EXCEEDING MINIMUM REGULATORY SCREENING VALUES IN SURFACE SOIL SITE 21 - BUILDING 1517/1506 AREA NAVAL STATION GREAT LAKES GREAT LAKES, ILLINOIS	CONTRACT NUMBER CTO C064
CHECKED BY N. ROCHNA	DATE 01/27/11			APPROVED BY B. CUMMINGS — DATE
COST/SCHED AREA				APPROVED BY — DATE
SCALE AS NOTED				FIGURE NO. FIGURE 4-7 — REV 0

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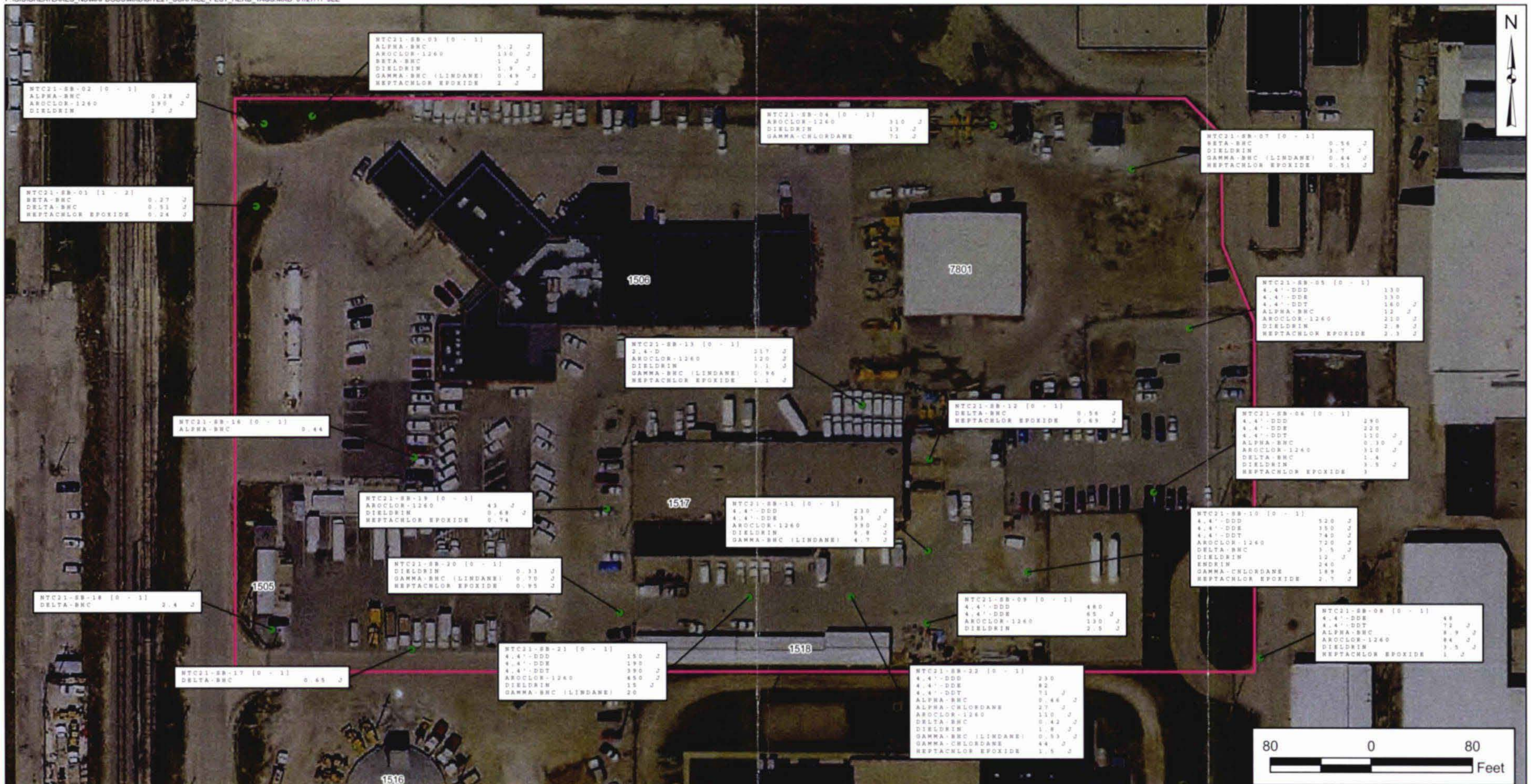

NOTES:
1. Results are expressed in micrograms per kilogram (ug/kg)
2. J = Estimated value
3. [0-1] = Depth interval ft-bgs that sample was collected from
4. Values shown exceed Minimum Screening Criteria. The Minimum Screening Criteria was derived from the following:
TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values
Non-TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values; and/or,
USEPA - Risk Based SSLs, Inhalation SSLs, and Residential Soil screening values.

DRAWN BY	DATE
K. MOORE	02/11/10
CHECKED BY	DATE
N. ROCHNA	01/27/11
COST/SCHED AREA	
SCALE AS NOTED	

NAVFAC

PESTICIDE/HERBICIDE CONCENTRATIONS EXCEEDING MINIMUM REGULATORY SCREENING VALUES IN SURFACE SOIL
SITE 21 - BUILDING 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER CTO C064	
APPROVED BY	DATE
B. CUMMINGS	
APPROVED BY	DATE
FIGURE NO. FIGURE 4-8	REV 0

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NOTES:
1. Results are expressed in nanograms per kilogram (ng/kg)
2. J = Estimated value
3. [0-1] = Depth interval ft-bgs that sample was collected from
4. Values shown exceed Minimum Screening Criteria. The Minimum Screening Criteria was derived from the following:
TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values
Non-TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values; and/or,
USEPA - Risk Based SSLs, Inhalation SSLs, and Residential Soil screening values.

DRAWN BY	DATE
K. MOORE	02/11/10
CHECKED BY	DATE
N. ROCHNA	01/27/11
COST/SCHED AREA	
SCALE AS NOTED	

NAVFAC

DIOXIN/FURAN CONCENTRATIONS EXCEEDING MINIMUM REGULATORY SCREENING VALUES IN SURFACE SOIL
SITE 21 - BUILDING 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER	
CTO C064	
APPROVED BY	DATE
B. CUMMINGS	
APPROVED BY	DATE
FIGURE NO. FIGURE 4-9	REV 0

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NOTES:
1. Results are expressed in milligrams per kilogram (mg/kg)
2. J = Estimated value
3. [0-1] = Depth interval ft-bgs that sample was collected from
4. Values shown exceed Minimum Screening Criteria. The Minimum Screening Criteria was derived from the following:
TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values
Non-TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values; and/or,
USEPA - Risk Based SSLs, Inhalation SSLs, and Residential Soil screening values.

DRAWN BY	DATE			CONTRACT NUMBER	
K. MOORE	02/11/10	NAVFAC	METAL CONCENTRATIONS EXCEEDING MINIMUM REGULATORY SCREENING VALUES IN SURFACE SOIL SITE 21 - BUILDING 1517/1506 AREA NAVAL STATION GREAT LAKES GREAT LAKES, ILLINOIS	CTO C064	
CHECKED BY	DATE			APPROVED BY	DATE
N. ROCHNA	01/27/11			B. CUMMINGS	
COST/SCHED AREA				APPROVED BY	DATE
SCALE AS NOTED				FIGURE NO. FIGURE 4-10	REV 0

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NOTES:
1. Results are expressed in micrograms per kilogram (ug/kg)
2. J = Estimated value
3. [0-1] = Depth interval ft-bgs that sample was collected from
4. Values shown exceed Minimum Screening Criteria. The Minimum Screening Criteria was derived from the following:
TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values
Non-TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values; and/or,
USEPA - Risk Based SSLs, Inhalation SSLs, and Residential Soil screening values.

DRAWN BY: K. MOORE	DATE: 02/11/10
CHECKED BY: N. ROCHNA	DATE: 01/27/11
COST/SCHED AREA	
SCALE: AS NOTED	

NAVFAC

VOC CONCENTRATIONS EXCEEDING MINIMUM REGULATORY SCREENING VALUES IN SUBSURFACE SOIL
SITE 21 - BUILDING 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER: CTO C064	
APPROVED BY: B. CUMMINGS	DATE:
APPROVED BY:	DATE:
FIGURE NO.: FIGURE 4-11	REV: 0

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NOTES:
1. Results are expressed in micrograms per kilogram (ug/kg)
2. J = Estimated value
3. [0-1] = Depth interval ft-bgs that sample was collected from
4. Values shown exceed Minimum Screening Criteria. The Minimum Screening Criteria was derived from the following:
TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values
Non-TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values; and/or,
USEPA - Risk Based SSLs, Inhalation SSLs, and Residential Soil screening values.

DRAWN BY	DATE
K. MOORE	02/09/10
CHECKED BY	DATE
N. ROCHNA	01/27/11
COST/SCHED AREA	
SCALE AS NOTED	

NAVFAC

SVOC CONCENTRATIONS EXCEEDING
MINIMUM REGULATORY SCREENING VALUES
IN SUBSURFACE SOIL
SITE 21 - BUILDING 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER CTO C064	
APPROVED BY	DATE
B. CUMMINGS	
APPROVED BY	DATE
FIGURE NO. FIGURE 4-12	REV 0

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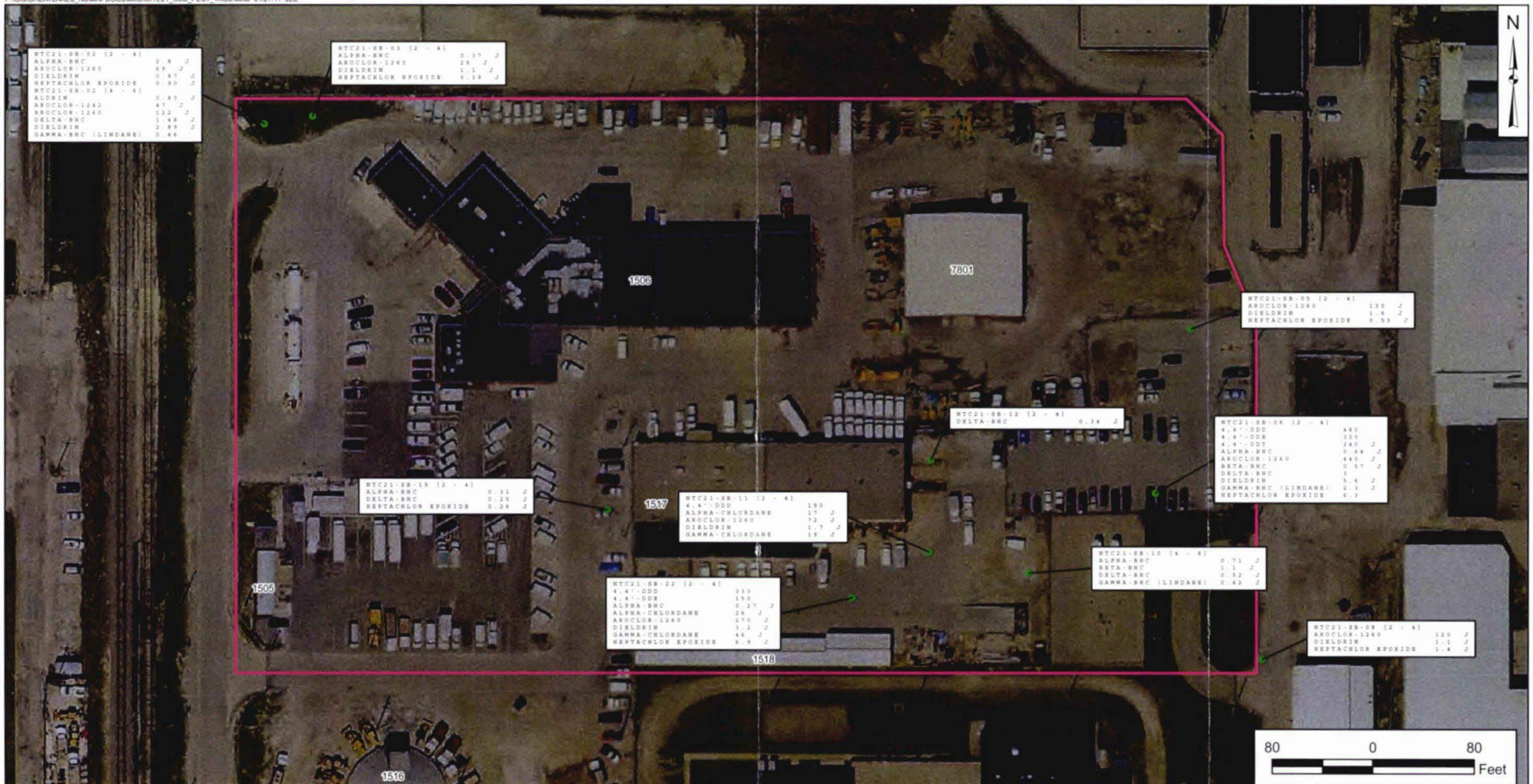

NOTES:
1. Results are expressed in micrograms per kilogram (ug/kg)
2. J = Estimated value
3. [0-1] = Depth interval ft-bgs that sample was collected from
4. Values shown exceed Minimum Screening Criteria. The Minimum Screening Criteria was derived from the following:
TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values
Non-TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values; and/or,
USEPA - Risk Based SSLs, Inhalation SSLs, and Residential Soil screening values.

DRAWN BY	DATE
K. MOORE	02/11/10
CHECKED BY	DATE
N. ROCHNA	01/27/11
COST/SCHED AREA	
SCALE AS NOTED	

NAVFAC

PESTICIDE/PCB CONCENTRATIONS EXCEEDING
MINIMUM REGULATORY SCREENING VALUES
IN SUBSURFACE SOIL
SITE 21 - BUILDING 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER CTO C064	
APPROVED BY B. CUMMINGS	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 4-13	REV 0

P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE21_SURFACE_DIOXINS_TAGS.MXD 01/27/11 JEE

NOTES:
1. Results are expressed in nanograms per kilogram (ng/kg)
2. J = Estimated value
3. [0-1] = Depth interval ft-bgs that sample was collected from
4. Values shown exceed Minimum Screening Criteria. The Minimum Screening Criteria was derived from the following:
TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values
Non-TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion, and Class 1 Soil to Groundwater screening values; and/or,
USEPA - Risk Based SSLs, Inhalation SSLs, and Residential Soil screening values.

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K. MOORE	02/11/10
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N. ROCHNA	01/27/11
COST/SCHED AREA	
SCALE AS NOTED	

NAVFAC

DIOXINS/FURAN CONCENTRATIONS EXCEEDING MINIMUM REGULATORY SCREENING VALUES IN SUBSURFACE SOIL
SITE 21 - BUILDING 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER CTO C064	
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B. CUMMINGS	
APPROVED BY	DATE
FIGURE NO. FIGURE 4-14	REV 0

P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE21_SUB_METALS_TAGS.MXD 01/27/11 JEE

NOTES:
1. Results are expressed in milligrams per kilogram (mg/kg)
2. J = Estimated value
3. [0-1] = Depth interval ft-bgs that sample was collected from
4. Values shown exceed Minimum Screening Criteria. The Minimum Screening Criteria was derived from the following:
TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion,
and Class 1 Soil to Groundwater screening values
Non-TACO - Residential Inhalation and Ingestion, Industrial Inhalation and Ingestion,
and Class 1 Soil to Groundwater screening values; and/or,
USEPA - Risk Based SSLs, Inhalation SSLs, and Residential Soil screening values.

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COST/SCHED AREA	
SCALE AS NOTED	

NAVFAC

METAL CONCENTRATIONS EXCEEDING
MINIMUM REGULATORY SCREENING VALUES
IN SUBSURFACE SOIL
SITE 21 - BUILDING 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER CTO C064	
APPROVED BY B. CUMMINGS	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 4-15	REV 0

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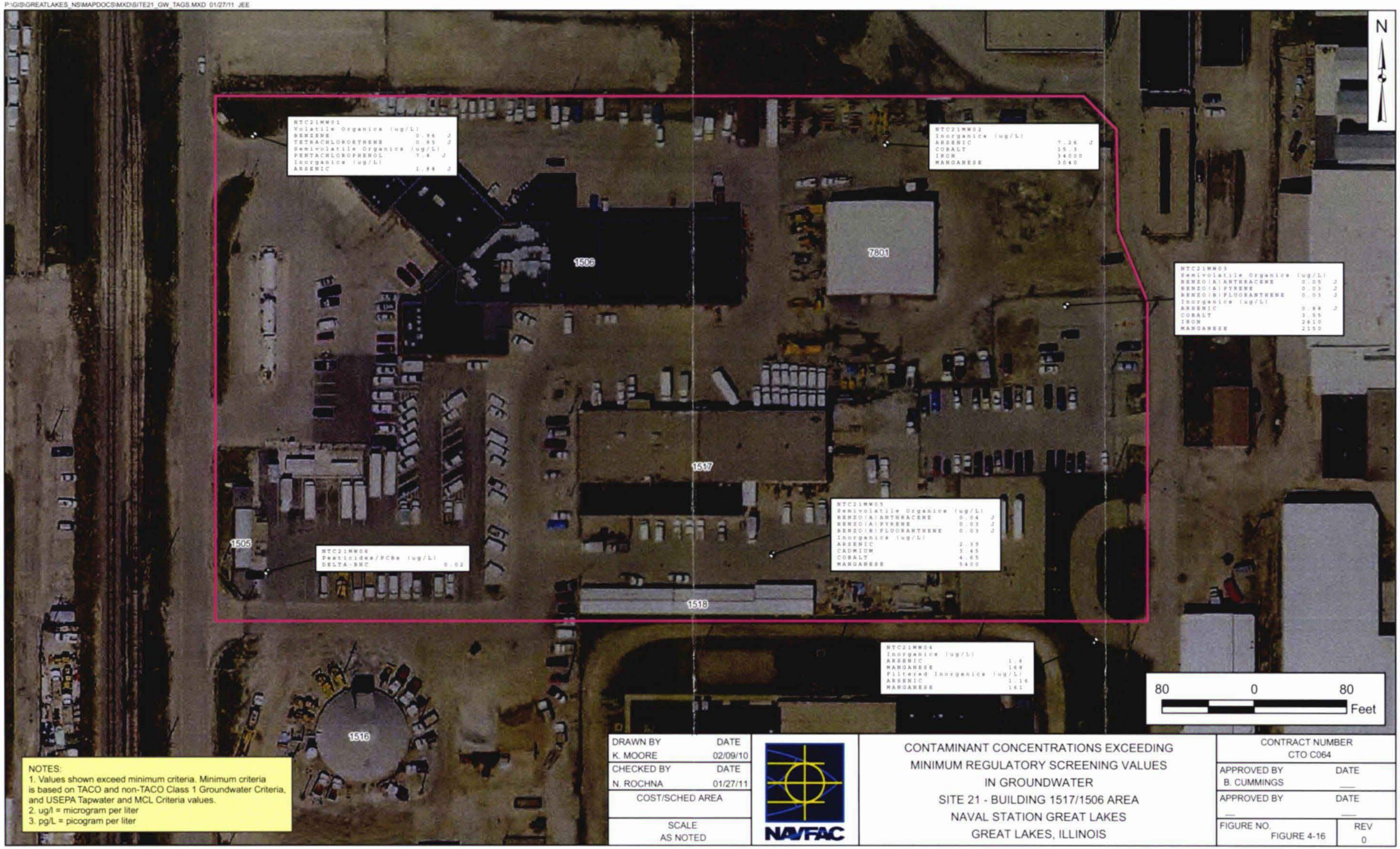

NOTES:
1. Values shown exceed minimum criteria. Minimum criteria is based on TACO and non-TACO Class 1 Groundwater Criteria, and USEPA Tapwater and MCL Criteria values.
2. ug/l = microgram per liter
3. pg/L = picogram per liter

DRAWN BY K. MOORE	DATE 02/09/10	NAVFAC	CONTAMINANT CONCENTRATIONS EXCEEDING MINIMUM REGULATORY SCREENING VALUES IN GROUNDWATER SITE 21 - BUILDING 1517/1506 AREA NAVAL STATION GREAT LAKES GREAT LAKES, ILLINOIS	CONTRACT NUMBER CTO C064
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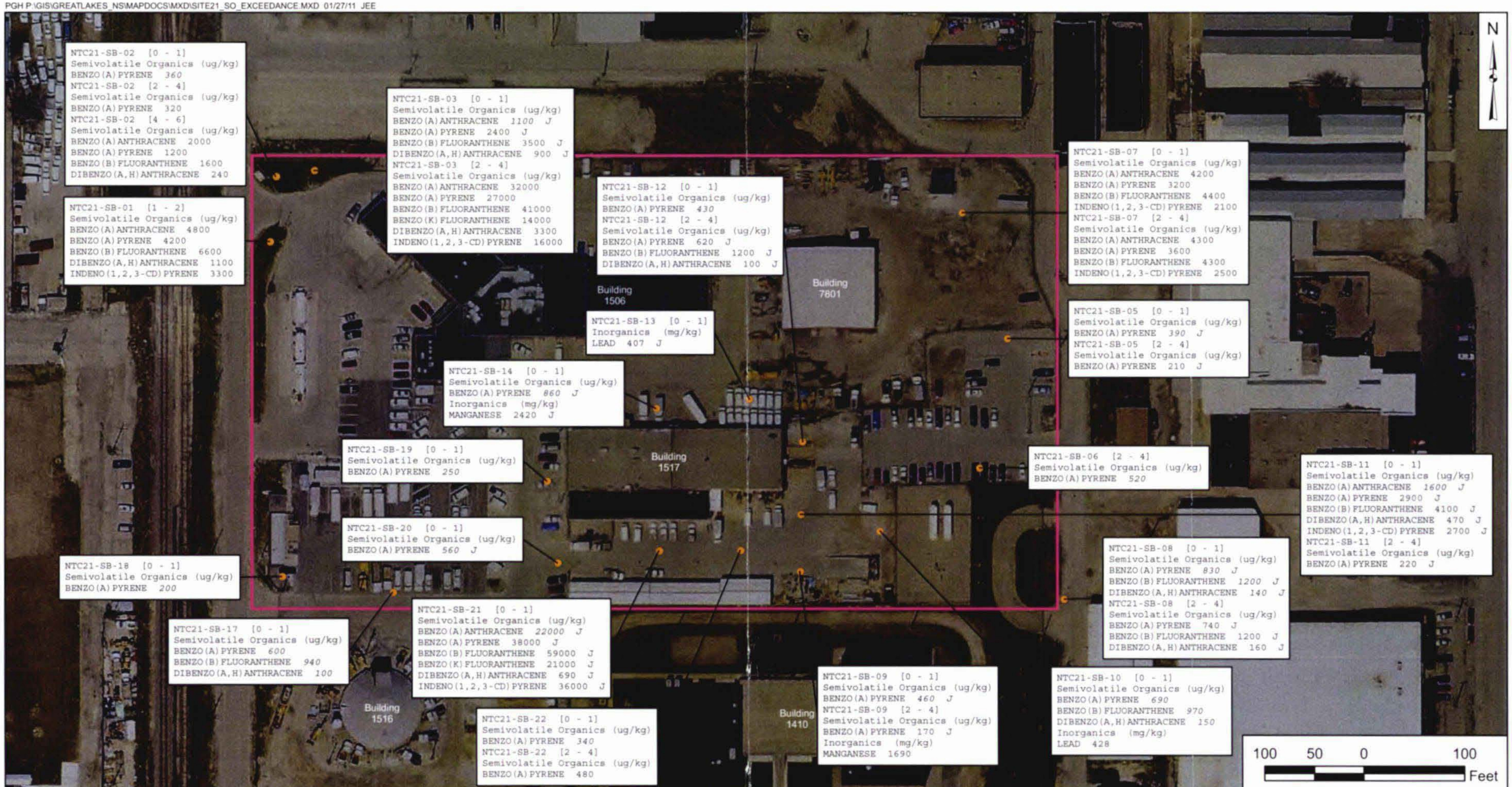
COST/SCHED AREA				APPROVED BY — DATE —
SCALE AS NOTED				FIGURE NO. FIGURE 4-16 — REV 0

PGH P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE21_SO_EXCEEDANCE.MXD 01/27/11 JEE



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T. WHEATON	12/13/10
CHECKED BY	DATE
N. ROCHNA	01/27/11
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

CONTAMINANT CONCENTRATIONS EXCEEDING
TACO INGESTION/INHALATION CRITERIA IN SOIL
SITE 21 - BUILDING 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER CTO 510	
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APPROVED BY	DATE
FIGURE NO. FIGURE 4-17	REV 0

PGH P:\GIS\GREATLAKES_NS\MAPDOCS\MXD\SITE21_GW_EXCEEDANCE.MXD 01/27/11 JEE

NOTES:
1. Values shown exceed minimum criteria. Minimum criteria is based on TACO and non-TACO Class 1 Groundwater Criteria, and USEPA Tapwater and MCL Criteria values.
2. ug/l = microgram per liter
3. pg/L = picogram per liter

DRAWN BY T. WHEATON	DATE 12/13/10	
CHECKED BY N. ROCHNA	DATE 01/27/11	
COST/SCHEDULE-AREA		
SCALE AS NOTED		

NAVFAC

CONTAMINANT CONCENTRATIONS EXCEEDING
TACO CRITERIA IN GROUNDWATER
SITE 21 - BUILDING 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER CTO 510	
APPROVED BY	DATE
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FIGURE NO. FIGURE 4-18	REV 0

5.0 HUMAN HEALTH RISK ASSESSMENT

This baseline Human Health Risk Assessment (HHRA) was performed to characterize and quantify potential health risks at Site 21 at Naval Station Great Lakes, Great Lakes, Illinois. The objective of the HHRA was to determine whether detected concentrations of chemicals within the study area pose a significant threat to potential human receptors under current and/or future land use. The HHRA for Site 21 is based on chemical data for surface soil, subsurface soil, and groundwater. The potential risks to human receptors are estimated based on the assumption that no actions will be taken to control contaminant releases.

Section 5.1 provides an overview of the HHRA process, and Sections 5.2 through 5.6 outline the methodology and results of the HHRA. Appendix G presents supporting materials for the HHRA. An analysis of the uncertainties is presented in Section 5.7. Section 5.8 summarizes the HHRA for Site 21. Tables documenting the HHRA were prepared following the standard format in accordance with USEPA risk assessment guidance for Superfund (USEPA, 2001), and are presented in Appendix G.

The HHRA conducted for this SI follows guidance documents from USEPA (1989, 1991, 1993, 1996, 1997, 2001, 2002a, 2002b, 2002c, 2004, and 2009), Navy (2001 and 2004) and State of Illinois (Illinois EPA, 2010a). The methodologies used in this HHRA complied with scientifically acceptable HHRA practices and USEPA guidance, including but not limited to the above referenced documents.

- USEPA, 1989. Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part A). EPA 540/1-89/002. Office of Emergency and Remedial Response, Washington, D.C.

- USEPA, 1991a. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response (OSWER) Directive 9285.6-03. Washington, D.C.

- USEPA, 1993c. Preliminary Review Draft: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure. OSWER, Washington, D.C.

- USEPA, 1996. Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128. OSWER. Washington, D.C.

- USEPA, 1997a. Exposure Factors Handbook. EPA/600/P-95/002Fa. OSWER, Washington, D.C.

- Navy, 2001b, Conducting Human Health Risk Assessments under the Environmental Restoration Program. Ser N453E/1U595168. Washington, D.C.

- USEPA, 2001. Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments).

- USEPA, December 2002b. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. Washington, D.C.

- USEPA, December 2002c. Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10. Washington, D.C.

- USEPA, 2004b. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final Guidance.

- USEPA, 2009. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), Final.

- Navy, 2004. Navy Final Policy on the Use of Background Chemical Levels.

- Illinois EPA, 2010a. TACO. Illinois Environmental Protection Agency, Bureau of Land, available online at http://www.epa.state.il.us/land/taco/.

The quantitative risk estimates are based on a number of assumptions about exposure and toxicity. Thus, the risk estimates may over- or underestimate the level of potential human health risks associated with a site.

5.1 OVERVIEW OF RISK ASSESSMENT PROCESS

A HHRA provides the framework for developing information necessary to determine the need for remediating and developing potential remedial alternatives for a site. A baseline HHRA consists of five major components, as follows:

- Data evaluation and identification of chemicals of potential concern (COPCs)
- Exposure assessment
- Toxicity assessment
- Risk characterization

- Characterization of uncertainty in the risk estimates

To assess potential public health risks, four major aspects of chemical contamination and exposure must be considered: contaminants with toxic characteristics must be found in environmental media; contaminants must be released by either natural processes or by human action; potential exposure points must exist either at the source or via migration pathways if exposure occurs at a remote location other than the source; and human receptors must be present at the point of exposure. Risk is a function of both toxicity and exposure. If any one of the requirements listed above is absent for a specific site, the exposure route is regarded as incomplete, and no potential risks are considered for human receptors.

The data evaluation component of the HHRA is primarily concerned with selecting COPCs and calculating exposure point concentrations (EPCs). Current study area data are considered in developing a list of COPCs. The chemical data are analyzed by medium and area in order to be representative of potential human health exposure, and COPCs are selected for each medium and exposure area. The EPCs provide the chemical input for each of the exposure pathways. A summary of the data evaluation process is contained in Section 5.2.

The selection of COPCs was based on chemical-specific concentrations, occurrence, distribution, and toxicity. COPCs were selected to represent site contamination and to provide the framework for the quantitative HHRA. A discussion of COPC selection is included in Section 5.3.

The exposure assessment identifies potential human exposure pathways. Exposure routes are identified by medium (i.e., surface soil, subsurface soil, and groundwater) based on information on study area chemical concentrations, chemical release mechanisms, human activity patterns, and other pertinent information, to develop a conceptual site model. A discussion of the exposure assessment is contained in Section 5.4.

The toxicity assessment presents the available human health criteria for the selected COPCs. This assessment is contained in Section 5.5. Quantitative toxicity indices are presented where they are available. A discussion of health effects and dose-response parameters such as Reference Doses (RfDs), Reference Concentrations (RfCs), Cancer Slope Factors (CSFs), and Unit Risks, is presented.

The risk characterization section (Section 5.6) describes how the estimated intakes are combined with the toxicity information to estimate risks. Uncertainties associated with the HHRA process are discussed qualitatively in Section 5.7. Section 5.8 summarizes the HHRA for Site 21.

5.2 DATA EVALUATION

Information associated with data usability for Site 21 is provided in this section. The HHRA presented in this report is based on the most recent analytical data collected at Site 21 during the most recent field activities.

Data utilized in this HHRA include validated analytical results of known and sufficient quality for use in quantitative risk calculations. The data used have been validated in accordance with USEPA Tier II or higher validation levels and determined to be of adequate quality for use in the HHRA. Fixed-base laboratory analytical results for target analytes from the field investigation were used in the quantitative risk evaluation. Unfiltered results for groundwater were used to assess risks associated with this medium. The Work Plan indicated that field measurements and data regarded as unreliable (i.e., qualified as "R" during the data validation process), would not be used in the quantitative HHRA. No data were qualified as unreliable. Analytical data qualified as estimated ("J", or "UJ") were used, even though the reported concentrations or sample-specific quantitation limits may be somewhat imprecise. The use of estimated data adds to the uncertainty associated with the HHRA; however, the associated uncertainty is expected to be negligible compared to the other uncertainties inherent in the risk evaluation process (i.e., uncertainties associated with land uses, exposure scenarios, toxicological criteria, etc.). Compounds that were detected above the laboratory detection limit at least once were included in the summary tables for that medium. Duplicate analytical results were not used for the EPC calculations. The duplicate results were used for sampling and analytical quality control purposes only. Data values less than sample-specific detection limits were reported as the detection limit, and the result designated as below detection limit by annotation.

Analytical results for samples used in this HHRA are presented in Appendix F. Section 3.0 of this SI Report discusses sample collection and fixed-based laboratory analysis by standard USEPA methods. Geologic soil boring and well construction logs from SI field activities are presented in Appendix B. Sample analytical results are presented in Section 4.0 of this report.

5.3 SELECTION OF CHEMICALS OF POTENTIAL CONCERN

The selection of COPCs is a qualitative screening process used to limit the number of chemicals and exposure routes quantitatively evaluated in the HHRA to those site-related constituents that dominate overall potential risks. Screening of site data against risk-based concentrations (RBCs) is used to focus the HHRA on meaningful chemicals and exposure routes.

In general, a chemical is selected as a COPC and retained for further quantitative risk evaluation in the HHRA if the maximum detection in a sampled medium exceeds a conservative screening value(s), as described below. Chemicals eliminated from further evaluation at this time are assumed to present minimal risks to potential human receptors.

5.3.1 Derivation of Screening Criteria

Several screening criteria were used to identify COPCs for Site 21. Screening concentrations based on risk-based cleanup objectives developed by Illinois EPA (2010) and Regional Screening Levels (RSLs; USEPA, 2010) developed by Oak Ridge National Laboratory (ORNL) for USEPA were used, as well as other USEPA criteria. The risk-based screening concentrations correspond to a systemic hazard quotient (HQ) of 0.1 for non-carcinogens, or an incremental lifetime cancer risk (ILCR) of $1x10^{-6}$ for carcinogens. Note that the Illinois EPA and USEPA residential screening levels (RSLs) for non-carcinogens are based on a HQ of 1.0, but screening concentrations for this HHRA were based on a HQ of 0.1 so that additive non-carcinogenic risks do not exceed 1.0. The screening levels used for each medium in the HHRA are briefly discussed below.

Screening Levels for Soil

The following criteria were used to select COPCs for surface and subsurface soil:

- Illinois EPA Tier 1 SROs (Illinois EPA, 2010b). These include remediation objectives for the soil ingestion exposure route and the inhalation exposure route. The lowest Tier I objective of the receptors (i.e., residential, industrial/commercial, or construction worker) listed in the Tier 1 Tables was used for screening.

- SROs for Chemicals not listed in TACO (Illinois EPA Non-Taco, 2010b).

- ORNL RSLs online at http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm.

- USEPA Generic Residential and Industrial soil screening levels (SSLs) for Inhalation of Volatiles and Fugitive Dusts, online at http://www.epa.gov/superfund/health/conmedia/soil/pdfs/ssg_appa-c.pdf (USEPA, 2002a).

- USEPA Soil Screening Levels for the Construction Worker Scenario (USEPA, 2002a).

If the maximum concentration of a constituent exceeded any of these criteria, the chemical was selected as a COPC.

The comparison of site soil data to USEPA inhalation SSLs for transfers from soil to air was used as a screening means to identify whether a quantitative analysis of this exposure pathway was warranted. If the maximum soil concentration of a chemical exceeded the Inhalation SSL, a quantitative evaluation of potential risks from inhalation was performed. Otherwise, the risks associated with the inhalation pathway were considered insignificant, and the exposure pathway was eliminated from further evaluation.

To evaluate the potential for chemicals detected in soil to impact groundwater, maximum chemical concentrations were compared to SSLs for migration to groundwater. The comparisons are presented in separate tables (from the direct contact COPC tables) and were used to select COPCs for soil. Migration-to-Groundwater SSLs were not used to select COPCs for quantitative risk evaluation because quantitative HHRAs are typically based on direct contact with soil or inhalation of vapors for VOCs and particulates. There is no methodology available for quantitative risk evaluation of indirect exposure based on migration to groundwater; therefore, it is not appropriate to select COPCs for quantitative risk evaluation for direct exposure on the basis of the indirect soil-to-groundwater pathway. The soil-to-groundwater SSLs provide an indication of potential impacts of contamination in soil on groundwater quality, but are not indicators of quantitative risk.

The migration from soil-to-groundwater comparisons were made using the following criteria:

- Illinois EPA Tier 1 SROs for Residential Properties for the Soil Component of the Groundwater Ingestion Exposure Route for Class I Groundwater (Illinois EPA, 2010c).

- USEPA Generic SSLs for Migration from Soil to Groundwater calculated online at http://rais.ornl.gov/epa/ssl1.shtml (SSLs published online at http://rais.ornl.gov/epa/ssl1.shtml were used to screen for migration from soil to groundwater since these values are more recent than those published in the 1996 and 2002 SSL guidance documents. [USEPA, 1996, 2002a]).

Results of the soil-to-groundwater comparisons are qualitatively discussed later in this HHRA in Sections 5.3.4 and 5.7, and also presented in separate tables.

COPCs were identified for subsurface soil because of the different associated exposure scenarios for potential human receptors. Subsurface soil was defined as soil collected from depths greater than 1 foot bgs. Construction workers were assumed to be exposed to subsurface soil. Exposures to subsurface soil for future occupational workers and hypothetical future residents were evaluated to account for the possibility that subsurface soil may be brought to the surface in a future excavation project.

Screening Concentrations for Groundwater

Direct exposure to groundwater at Site 21 is not expected to occur under current and/or future land uses because the facility and surrounding area are supplied by public water, the facility has an ordinance for groundwater use prohibition in place, and there are no drinking water wells located immediately downgradient of the site. However, the residential groundwater scenario was evaluated based on the conservative assumption that groundwater at the site could be used as a source of domestic drinking water in the future, and industrial exposure to groundwater was evaluated to account for the possibility that future construction workers may come into dermal contact with groundwater during excavation or construction activities. Groundwater screening levels for the protection of indoor air through potential vapor intrusion were used to identify COPCs in groundwater for this pathway. If concentrations of a chemical(s) detected in groundwater exceeds the vapor intrusion screening levels, potential risks for the chemical(s) are quantitatively evaluated using the Johnson and Ettinger Vapor Intrusion Model (Johnson and Ettinger, 1991; USEPA, 1997a).

Although site groundwater is not a source of drinking water, the following criteria were conservatively used to select COPCs for groundwater per the HHRA Work Plan (Tetra Tech, 2008):

- Illinois EPA Tier 1 GROs for Class 1 Groundwater (Illinois EPA, online at http://www.ipcb.state.il.us/SLR/IPCBandIllinois EPAEnvironmentalRegulations-Title35.asp).
- GROs for Chemicals Not Listed in TACO (Illinois EPA, 2010d).
- ORNL Regional Screening Levels for Chemical Contaminants at Superfund Sites (USEPA, 2010).
- USEPA Maximum Contaminant Levels (MCLs) (USEPA, 2006).
- USEPA Groundwater Screening Levels for Evaluating the Vapor Intrusion to Indoor Air (USEPA, 2002b).

If the maximum concentration of a constituent exceeded any of these criteria, the chemical was selected as a COPC and carried through to the quantitative HHRA.

Surface Water and Sediment

There are no surface water features on Site 21; therefore, these are not exposure media associated with this site.

Essential Nutrients, Metals, and Chemicals Without Toxicity Criteria

The essential nutrients calcium, magnesium, potassium, and sodium were not selected as human health COPCs for Site 21. These inorganic chemicals are naturally abundant in environmental matrices and are only toxic at high doses. In addition, because of the lack of toxicity criteria, risk-based COPC screening levels are not available for some chemicals (e.g., benzo(g,h,i)perylene, etc.). Appropriate surrogates were selected for some of these chemicals based on similar chemical structures and are noted when used.

In addition, some inorganic metals (other than essential nutrients) are also abundant in environmental matrices. The inorganics are compared to the Illinois Inorganic Background levels, as discussed later in this HHRA.

Determination of Site-Related Chemicals - Background Evaluation

The procedures for the elimination of chemicals as COPCs on the basis of background concentrations followed current U.S. Navy policy (U.S. Navy, 2004). At the present time, facility background concentrations for naturally occurring or anthropogenic chemicals have not been determined for Naval Station Great Lakes. Therefore, maximum soil concentrations were compared to the concentrations of inorganic and PAH chemicals provided by Illinois EPA in Appendix A, Table G and Table H of TACO, respectively.

Navy policy as it applies to HHRAs requires the following:

1. A clear and concise understanding of chemicals released from a site, thus making sure the Navy is focusing on remediating the release.

2. The use of background data in the screening-level HHRA.

    a. The comparison of site chemical levels to risk-based screening criteria.
    b. The comparison of site chemical levels to background concentrations.
    c. The identification of site-related COPCs based on screening criteria comparisons and background comparisons. Site-related COPCs are those chemicals with concentrations exceeding risk-based screening criteria and background concentrations. To the extent possible, site-related COPCs are further evaluated quantitatively in the HHRA.

3. The consideration of background in the HHRA.

a. The calculation of risk estimates for site-related COPCs only.

b. The further evaluation of non-site-related COPCs in the risk characterization section (e.g., the evaluation of chemicals detected at concentrations exceeding screening criteria but less than background concentrations). The Navy considers this comparison to be consistent with USEPA's Role of Background in the CERCLA Cleanup Program (USEPA, 2002a).

4. The selection of site cleanup remedial goals at concentrations not less than background levels. Additionally, cleanup levels should not be developed for chemicals not identified as COCs. As defined in the Navy guidance, COCs are site-related COPCs found to be the risk drivers in the HHRA.

To determine whether inorganic and anthropogenic organic chemicals are present at concentrations greater than background, maximum detected concentrations of inorganic chemicals and PAHs in soil were compared to background levels provided by Illinois EPA, and the results are discussed in the Uncertainty Section. However, no chemicals were excluded from the initial COPC selection process based on background.

Screening Concentrations for Lead

Limited criteria are available to evaluate the potential risks associated with lead. There are no risk-based concentrations for this compound because the USEPA has not derived toxicity values for lead. However, recommended screening levels available for lead in soil are used to indicate the need for response activities. Guidance from both the Office of Prevention, Pesticides, and Toxic Substances (OPPTS) and OSWER recommend 400 mg/kg as the lowest screening level for lead-contaminated soil in a residential setting where children are frequently present (USEPA, 1994). OPPTS identifies 2,000 to 5,000 mg/kg as an appropriate range for areas where contact with soil by children in a residential setting is less frequent. While the Safe Drinking Water Act Action Level of lead is 15 µg/L (USEPA, 2006), the more conservative Illinois EPA groundwater standard of 7.5 µg/L was used as a screening level for lead in groundwater.

A discussion of the chemicals identified as COPCs and the rationale for their selection is provided in the following sections.

5.3.2 COPC Selection for Surface Soil

This section presents the results of the COPC selection process for surface soil. The COPC screening process for surface soil and the results of the screening are presented in Table 5-1 (RAGS Part D tables, Table 2s). As previously discussed and noted in Table 5-1, screening values for risk-based non-carcinogenic compounds were reduced by a factor of 10 to correspond to a target hazard quotient of 0.1. The following chemicals were retained as COPCs for surface soil:

- SVOCs – carcinogenic PAHs (c-PAHs) in benzo(a)pyrene equivalents (BaP Eq), naphthalene.
- PCBs – Aroclor-1260.
- Dioxins – 2,3,7,8- toxic equivalents (TEQs).
- Inorganics – aluminum, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, manganese, mercury, and vanadium.

These constituents were identified as COPCs in surface soil because maximum concentrations exceeded USEPA ORNL RSLs or Illinois TACO risk-based screening levels (primarily for residential soil).

The maximum concentrations were also compared to USEPA Generic SSLs for migration from soil to air (inhalation), when available. The maximum concentrations of mercury exceeded the inhalation SSLs for industrial or residential scenarios; therefore, risks from inhalation of this chemical were quantitatively evaluated. The maximum concentrations of aluminum, arsenic, barium, cadmium, cobalt, manganese, mercury, and naphthalene exceeded the inhalation SSLs for the construction worker scenario; therefore, risks from inhalation of these constituents on dusts/particulates (and naphthalene also for inhalation of volatiles) were quantitatively evaluated conservatively for the receptors, as well.

Background Surface Soil Concentrations

Maximum surface soil organic and PAH concentrations were compared to concentrations in the background data set established for use by the Illinois EPA. The background level for benzo(a)pyrene in metropolitan area soils (2.1 mg/kg) is lower than the maximum BaP Equivalents (BaP Eq) soil sample result (50.63 mg/kg). c-PAHs may have been associated with Site 21 waste disposal and therefore it is reasonable to include them as COPCs in surface soil. Therefore, no chemicals detected in surface soil were excluded as COPCs based on background conditions.

When the maximum concentrations of the inorganic compounds detected at Site 21 in surface soil were compared to background data established for use by the Illinois EPA, no inorganics were found to be below background, based on maximum concentrations. However, if the overall averages of detected inorganics were compared to the background data set, aluminum, antimony, arsenic, barium, cobalt, iron, manganese, and vanadium were below the background values. This indicates that it is possible that these inorganic compounds at Site 21 could be background constituents.

5.3.3 COPC Selection for Subsurface Soil

This section presents the results of the COPC selection process for subsurface soil. The COPC screening process for subsurface soil and the results of the screening are presented in Table 5-2 (RAGS Part D tables, Table 2s). As previously discussed and noted in Table 5-2, screening values for risk-based non-carcinogenic compounds were reduced by a factor of 10 to correspond to a target hazard quotient of 0.1. The subsurface soil data set consists of samples collected from depths greater than 1 foot bgs. The following chemicals were retained as COPCs for subsurface soil:

- SVOCs – c-PAHs (BaP Eq), naphthalene.
- PCBs – Aroclor-1260.
- Dioxins – TEQs.
- Inorganics – aluminum, arsenic, cadmium, chromium, cobalt, iron, manganese, mercury, and vanadium.

These constituents were identified as COPCs in subsurface soil because maximum concentrations exceeded USEPA ORNL RSLs or Illinois TACO risk-based screening levels (primarily for residential soil).

The maximum concentrations were also compared to USEPA Generic SSLs for migration from soil to air (inhalation), when available. No COPCs exceeded the inhalation SSLs for industrial or residential scenarios; therefore, none of the COPCs were considered of significant risk from inhalation. The maximum concentrations of naphthalene, manganese, mercury, aluminum, arsenic, cadmium, and cobalt exceeded the inhalation SSLs for the construction worker scenario; therefore, risks from inhalation of these constituents on dusts/particulates (and naphthalene also for inhalation of volatiles) were quantitatively evaluated conservatively for the receptors, as well.

Background Subsurface Soil Concentrations

Maximum subsurface soil concentrations were also compared to concentrations in the background data set established for use by the Illinois EPA. Recognizing that the Illinois EPA dataset was for surface soil, this was done just for comparison purposes. The background level for benzo(a)pyrene in metropolitan area soils (2.1 mg/kg) is lower than the maximum BaP Eq soil sample result (39.37 mg/kg). PAHs may have been associated with Site 21 waste disposal and therefore it is reasonable to include them as COPCs in subsurface soil. Therefore, no chemicals detected in subsurface soil were excluded as COPCs based on background conditions.

When the maximum concentrations of the inorganic compounds detected at Site 21 in subsurface soil were also compared to Illinois EPA background data, also just for general comparison, no inorganics were found to be below background, based on maximum concentrations. However, if the overall averages of detected inorganics were compared to the background data set, aluminum, arsenic, chromium, cobalt, manganese, and vanadium were below the background values. This indicates that it is possible that these inorganic compounds at Site 21 could be background constituents.

5.3.4 Migration of Chemicals from Soil to Groundwater

A quantitative evaluation of the migration of chemicals from soil to groundwater was not included in this HHRA. However, soil data were compared to Illinois EPA Tier 1 TACO and Non-TACO SROs for Residential Properties for the Soil Component of the Groundwater Ingestion Exposure Route for Class I Groundwater, and USEPA Generic SSLs for migration from soil to groundwater (Table 5-17, a and b). The soil-to-groundwater SSLs were not used to select COPCs for quantitative risk evaluation, but to provide an evaluation of the potential impact of chemicals detected in soil or groundwater. Exceedances of the soil-to-groundwater SSLs, and a qualitative discussion of this pathway are included in the uncertainty section (Section 5.7, of this HHRA).

5.3.5 COPC Selection for Groundwater

A comparison of maximum detected groundwater concentrations to ORNL RSLs for ingestion of tap water, USEPA MCLs, and Illinois EPA GROs is presented in Table 5-3 (RAGS Part D tables, Table 2s). The following chemicals exceeded one or more of the groundwater screening criteria, therefore were retained as COPCs for groundwater:

- VOCs – benzene, tetrachloroethylene.
- SVOCs – c-PAHs (BAP equivalents), pentachlorophenol.
- Pesticides – delta-BHC.
- Dioxins – TEQs.
- Inorganics – arsenic, cadmium, cobalt, iron, and manganese.

These COPCs exceeded one or more of the groundwater screening criteria.

Vapor Intrusion Pathway from Groundwater to Soil

Vapor intrusion is the migration of volatile chemicals from the subsurface into overlying buildings. Volatile chemicals in buried wastes and/or contaminated groundwater can emit vapors that may migrate through subsurface soil and into indoor air spaces of overlying buildings (USEPA, 2002b). No COPCs in groundwater exceeded vapor intrusion screening levels; therefore, risks via vapor intrusion were not considered significant.

5.3.6 Summary

Table 5-4 summarizes the chemicals retained as COPCs for surface soil, subsurface soil, and groundwater at Site 21.

5.4 EXPOSURE ASSESSMENT

The exposure assessment estimates the extent of human contact with COPCs by characterizing potentially exposed populations of individuals (i.e., receptors), identifying actual or potential pathways of exposure that are appropriate for each potential receptor, and estimating the extent of human exposure.

An exposure pathway identifies the exposure routes for potentially complete pathways at the site and describes the mechanism by which human receptors may come into contact with site-related COPCs. Exposure pathways are dependent on both current and future land use. An exposure pathway is defined by the following four elements (USEPA, 2005a):

- A source material and mechanism of constituent release to the environment.
- An environmental migration or transport medium (e.g., soil) for the COPCs.
- A point of potential human contact with the medium of interest (e.g., potential exposure to the contaminated soil).
- An exposure route (e.g., ingestion, dermal contact) at the point of contact.

An exposure pathway is considered "complete" if all elements are present. If complete and deemed a significant risk, these pathways are quantitatively evaluated in the HHRA.

The potential for exposure at Site 21 is based on several factors including current and future land uses, human activity patterns, site access controls, chemical behavior in the environment, and the presence of human receptors. Based on these variables, exposure scenarios were developed that characterize the potential for human exposure under both current and future site conditions. The future scenario accounts for potential or anticipated changes in land use, and site characteristics that may alter exposure conditions at the site. The exposure assessment assumes that, in general, chemical compositions for environmental media are identical under current and future site conditions.

The exposure assessment presented in this section of the report describes the physical site setting and potential receptors of concern, identifies the potential contaminant migration and exposure pathways, defines the contaminant concentrations at the point of exposure, and presents the equations used to quantify exposure in terms of contaminant intake (dose). Appendix G presents summary calculations of the chemical-specific intakes for the receptors and exposure pathways, and also contains example calculations of the chemical intakes.

5.4.1 Site Background, Land Use, and Site Access

A detailed description of the Naval Station Great Lakes is included in Section 2.0 of this report. As mentioned previously, Naval Station Great Lakes administers base operations and provides facilities and related support to training activities (including the U.S. Navy's only boot camp), as well as a variety of other military commands located on base. There are a variety of land uses that currently surround Naval Station Great Lakes. Along the northern boundary of the base are the most highly urbanized and industrial areas. Much of the land beyond the northwestern site boundary comprises unincorporated lands of Lake County and is vacant except for scattered retail and residential properties. Adjacent to the western boundary are primarily industrial properties, and along the southern boundary is a mixture of public open space and residential land.

Site 21 is located in the northern portion of NS Great Lakes, and is approximately 7 acres in size. Site 21 contains several buildings, parking lots, and is almost entirely paved, with very little vegetation. Under current land use, access to and use of Site 21 is primarily limited to military personnel. However, to aid in risk management decisions, the site investigation also considers potential receptors, such as future residents, who might be exposed to contaminants persisting in site media or migrating from the site.

5.4.2 Conceptual Site Model

The development of a (Conceptual Site Model) CSM is an essential component of the exposure assessment. The CSM integrates information regarding the physical characteristics of the site, exposed populations, sources of contamination, and contaminant mobility (fate and transport) to identify potential exposure routes and receptors to be evaluated in the HHRA. A well-developed CSM will allow a better understanding of the risks at a site and will aid risk managers in identifying the potential need for any additional environmental sampling and remediation. The site-specific CSM for Site 21 is presented in this section and illustrated on Figure 5-1. Table 5-5 presents a summary of the exposure pathways that were addressed quantitatively for each human receptor. The CSM depicts the relationships among the following elements:

- Site sources of contamination and potential COPCs
- Contaminant release mechanisms
- Transport pathways
- Exposure routes/pathways
- Potential receptors.

These elements of the CSM for Site 21 are discussed in the following sections.

5.4.2.1 Site Sources of Contamination

Building 1517, located on Site 21, is used for equipment storage, and was historically associated with the salvage operations at Naval Station Great Lakes. The area north of Building 1517 may have been used to store waste or scrap material on concrete pads next to rail spurs from the 1930s to 1940s. These materials may have been hauled away by railcar, or the waste materials may have been sent to an incinerator, which was located in the northwest portion of the site until 1964. Prior to 1950 until the 1960s or 1970s, the site was used as a coal stockpile area, which covered most of Site 21 north of Building 1517. Two nearby sites may also have affected Site 21. One of these sites is Building 1600A, which is located northwest of Site 21. Several leaks associated with USTs, which were likely used for oil or fuel storage, were identified there. A plume of contaminated groundwater was documented to extend from Building 1600A onto the northwest corner of Site 21. The groundwater plume was cleaned up to meet regulatory standards using biosparging techniques and the site was closed. However impacted soils from the Building 1600A release are considered to remain on Site 21. The other site, Site 5, otherwise known as the Transformer Storage Boneyard, was located south of Site 21. It was the primary storage area for out-of-service transformers from 1945 to 1985. Elevated levels of PCBs have been detected there.

5.4.2.2 Contaminant Release Mechanisms and Migration Pathways

Chemicals could be released from the source area by a variety of mechanisms including:

- Transport of chemicals deposited in surface and subsurface soil; and groundwater via infiltration, percolation, and migration within the shallow groundwater aquifer.

- Migration of fugitive dusts and VOCs from surface and subsurface soil to ambient air if construction/excavation activities occur in the future.

- Volatilization of VOCs from groundwater into the indoor air of current buildings or future residential and commercial buildings.

Receptors may be exposed either directly or indirectly to contaminants in environmental media via a variety of mechanisms. The exposure mechanisms considered included working outdoors, residential, etc. These exposure mechanisms generally act along one or more exposure routes such as ingestion, inhalation, or direct dermal contact.

Figure 5-1 shows the Site 21 CSM, which illustrates these potential contaminant migration pathways.

5.4.2.3 Exposure Mechanisms/Exposure Routes/Potential Receptors

The potential for exposure to contamination at Site 21 is based on several factors, including current and future land uses, human activity patterns, site access controls, and contaminant behavior in the environment. Based on these variables, different scenarios were developed to characterize the potential for human exposure under current and future site conditions. In addition to exposures that may result from current uses of the site, the future scenario also accounts for potential changes in land use and site characteristics that may alter the presence of COPCs in a given medium and exposure to them.

The exposure assessment is based on the assumption that, in general, chemical compositions for various environmental media are identical under current and future site conditions.

Naval Station Great Lakes is an active facility and will remain so for the foreseeable future. Under current land use, access to and use of Site 21 is primarily limited to military personnel and employees. However, to aid in risk management decisions, the risk assessment considered potential receptors, such as future residents, who might be exposed to contaminants persisting in site media or migrating from the site. The potential receptors have been identified by analyzing current land use practices, potential future land uses, and the identified areas of contamination in order to focus the risk assessment on potential site-related exposures. The general receptor classes include:

- **Construction Workers** - Potential receptors under future land uses. Construction workers are assumed to be civilian personnel who may be involved in a short-term, one-time construction project. Excavation and ground-intrusive activities may occur on the site in the future. If these excavation projects were to occur, construction workers could potentially be exposed to surface and subsurface soil to an estimated depth of 10 feet bgs (conservative estimate based on available site information) by ingestion and dermal contact. They could also potentially directly contact groundwater (estimated depth to groundwater at the site ranges from 4 to 10 feet bgs) by dermal contact. Construction workers may also be exposed by the inhalation of soil or vapors emitted from groundwater during excavation.

- **Adolescent Trespassers** – Potential receptors under current land use. Adolescent trespassers were assumed to be exposed to surface soil by ingestion, dermal contact, and inhalation.

- **Maintenance/Occupational Workers** – Potential receptors under future and current land use. Current maintenance/occupational workers include personnel conducting daily paperwork, individuals re-stocking military equipment, and landscapers. Consideration of future maintenance/occupational workers accounts for the possibility that Naval Station Great Lakes might be developed for commercial/industrial uses at some future time. Maintenance/occupational workers were assumed to be exposed to surface soil by ingestion, dermal contact, and inhalation.

- **Future Civilian Residents (Adults/Children)** – Potential receptor under future land use. Hypothetical future residents are not potential receptors under current land use but were evaluated to aid in risk management decisions by providing an indication of potential risks if the facility were to close and be developed for residential use. Future onsite residents were assumed to be exposed to surface and subsurface soil by ingestion, dermal contact, and inhalation. Direct exposure to groundwater at Site 21 is not expected to occur under current and/or future land uses because the facility and the area surrounding the facility are supplied by public water, the facility has a groundwater use restriction in place, and there are no drinking water wells located immediately downgradient of the site. However, the residential groundwater scenario was evaluated based on the assumption that groundwater at the site, although very unlikely, could be used as a source of domestic drinking water in the future, and exposure could occur through dermal contact, ingestion, and inhalation of volatiles.

- **Future Military Residents (Adults/Children)** – Potential receptor under future land use. Military residents are not potential receptors under current land use because they do not live on the site. They were evaluated primarily for decision-making (risk management) purposes based on the assumption that the site could support military residential use in the future, and are assumed to be exposed via the same routes as future civilian residents. Risks to military residents will be evaluated qualitatively to future civilian residents because exposure duration of military residents would be lower than exposure duration of civilian residents.

5.4.3 Central Tendency Exposure versus Reasonable Maximum Exposure

Traditionally, exposures evaluated in the HHRA were based on the concept of a Reasonable Maximum Exposure (RME) only, which is defined as "the maximum exposure that is reasonably expected to occur at a site" (USEPA, 1989). However, more recent HHRA guidance (USEPA, 1993) indicates the value of addressing an average case or Central Tendency Exposure (CTE) as well as the RME.

To provide a full characterization of potential exposure, both RME and CTE were evaluated in the HHRA for Site 21. The available guidance (USEPA, 1993 concerning the evaluation of CTE is limited; therefore, professional judgment was used when defining CTE conditions for a particular receptor at the site. Exposure factors and assumptions for the CTE are presented and discussed in Section 5.4.5.

5.4.4 Exposure Point Concentrations

The following guidelines were used to calculate the EPCs:

- If a soil data set for an Exposure Unit (EU) contained fewer than 10 samples, the EPC for the RME and CTE cases was defined as the maximum detected concentration.

- If a soil data set for an EU contained 10 or more samples, the following receptor-specific EPCs were used:

    - Trespassers and maintenance/occupational workers were assumed to be exposed to the upper confidence limit (UCL) on the arithmetic mean, which was based on the distribution of the data set, for the RME cases. The EPCs were calculated following USEPA's Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (USEPA, 2002c) using the USEPA's ProUCL software (USEPA, 2007a). They were assumed to be exposed to the mean for CTE cases.

    - Construction workers, and child and adult residents, were assumed to be exposed to the maximum detected concentration. The maximum detected concentration was used as the EPC for construction workers because of the possibility that construction workers might be exposed to a small highly concentrated area during the short exposure duration assumed for this receptor. They were assumed to be exposed to the mean for CTE cases.

    - For groundwater, Section 742.225a of TACO indicates that contaminant concentrations of discrete samples at each sample point should be evaluated. Based on this guidance, risks for groundwater were characterized by assuming exposure to the well with the highest groundwater concentrations for both RME and CTE.

Duplicate analytical results were not used for the EPC calculations. The duplicate results were used for sampling and analytical quality control purposes only. Data values less than sample-specific detection limits were reported as the detection limit and the result designated as below detection by annotation.

The EPCs for the chemicals identified as COPCs in subsurface soil, surface soil, and groundwater at Site 21 are presented in Tables 5-6, 5-7, and 5-8, respectively (RAGS Part D tables, Table 3s).

5.4.5 Intake Estimation Methods and Exposure Parameters

To determine potential human health risks associated with Site 21, an estimate of chemical intake was made in accordance with current USEPA guidance. Exposure parameters and exposure concentrations were used to derive estimates of chemical intake for each exposure route, pathway, and receptor. The resulting chemical intakes were integrated with the toxicity factors discussed in Section 5.5 to develop quantitative risk estimates for potential receptors at the site. Intakes for the identified potential receptor groups were calculated using current EPA HHRA guidance (USEPA, 1989, 2004 and 2009) and presented in the HHRA spreadsheets (Appendix G). In accordance with current USEPA guidance, chemical intakes (and risks) were estimated for both the CTE and RME conditions. Values of exposure parameters used to quantify exposure for each receptor are presented in Tables 5-9 and 5-10 for the RME and CTE, respectively.

The following sections present the equations used to estimate chemical intakes for the exposure routes identified for quantitative evaluation. Example calculations are contained in Appendix G.

5.4.5.1 Exposure to COPCs in Soil

The HHRA assumed that construction workers, maintenance workers, adolescent trespassers, occupational workers, and potential future residents (military and civilian; child and adult) may come into contact with chemicals detected in soil at the site. Soil exposure routes evaluated were incidental ingestion, dermal contact, and inhalation. A description of the methods and assumptions used to quantify soil exposure follows.

Dermal Contact with Soil

Doses for dermal contact with soil were estimated using the following equation (USEPA, 2004:

$$DEX = \frac{C \times SA \times AF \times ABS \times EF \times ED \times CF}{BW \times AT}$$

where:	DEX	=	dermal dose (mg/kg-day)
	C	=	chemical concentration in soil (mg/kg)
	SA	=	skin surface area available for contact (cm^2/day)
	AF	=	soil-to-skin adherence factor (mg/cm^2)
	ABS	=	absorption factor (unitless)
	EF	=	exposure frequency (days/year)
	ED	=	exposure duration (years)

CF = conversion factor (1×10^{-6} kg/mg)

BW = body weight (kg)

AT = averaging time (days)

for non-carcinogens: ED x 8,760 hours

for carcinogens: 365 days/year x 70 years

Exposed skin surface areas available for dermal contact were determined for each receptor based on assumed human activities and clothing worn during exposure events. USEPA guidance (USEPA, 1997a and 2004 was used to develop the default assumptions concerning the amount of skin surface area available for contact for a receptor. The skin surface areas used in HHRA calculations and the rationale for the selection of the surface areas are as follows:

- Maintenance workers, occupational workers, and construction/excavation workers were assumed to be exposed on the head, hands, and forearms assuming that they wear a short-sleeved shirt, long pants, and shoes. As recommended in RAGS Part E (USEPA, 2004, this skin surface area is assumed to be 3,300 cm^2 for the RME and CTE scenarios. This value represents the average of the 50^{th} percentile areas of males and females more than 18 years old.

- For future adult residents assumed to be exposed to soil, the exposed surface area available for contact was the value for the adult skin surface area for exposure to soil recommended in RAGS Part E (USEPA, 2004: 5,700 cm^2 for both RME and CTE. This skin area assumes that head, hands, forearms, and lower legs of the adult are available for contact. For child residents assumed to be exposed to soil, the exposed surface area available for contact was the value for child skin surface area for exposure to soil recommended in RAGS Part E (USEPA, 2004: 2,800 cm^2 for both RME and CTE. This skin area assumes that head, hands, forearms, lower legs, and feet of the child are available for contact.

Values of soil adherence factors and chemical-specific dermal absorption factors provided in RAGS Part E (USEPA, 2004 were used to evaluate risks from exposure to soil. The following soil adherence factors were used for the RME and CTE exposure scenarios:

- Maintenance/ Occupational Workers and Adolescent Trespassers – 0.2 mg/cm^2 for the RME and 0.02 mg/cm^2 for the CTE (Exhibit 3.5).
- Construction Workers – 0.3 mg/cm^2 for the RME and 0.1 mg/cm^2 for the CTE (Exhibit 3.3).
- Future Adult Residents – 0.07 mg/cm^2 for the RME and 0.01 mg/cm^2 for the CTE (Exhibit 3.5).
- Future Child Residents – 0.2 mg/cm^2 for the RME and 0.04 mg/cm^2 for the CTE (Exhibit 3.5).

For constituents identified as COPCs in soil, the following absorption factors were used (USEPA, 2004:

- Arsenic – 0.03
- Cadmium – 0.001
- PAHs – 0.13
- Dioxins/furans – 0.03
- Aroclor 1260 – 0.14
- Other semivolatiles – 0.1
- Other inorganics and volatile organics – not evaluated for dermal contact with soil

Exposure parameters for the dermal exposure route are summarized in Tables 5-9 and 5-10, for RME and CTE, respectively.

Incidental Ingestion of Soil

Intakes associated with soil ingestion were estimated using the following equation (USEPA, 1989):

$$\text{Intake} = \frac{C \times IR \times FI \times EF \times ED \times CF}{BW \times AT}$$

where:

Intake	=	ingestion intake
C	=	chemical concentration in soil (mg/kg)
IR	=	soil/sediment ingestion rate (mg/day)
FI	=	fraction ingested from contaminated source (unitless)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
CF	=	conversion factor (1×10^{-6} kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days)
		for non-carcinogens: 365 days/year x ED
		for carcinogens: 365 days/year x 70 years

Exposure frequencies and durations for the incidental ingestion of soil are summarized in Tables 5-9 and 5-10, for RME and CTE, respectively. A default value of 1.0 (USEPA, 1989) was used for the fraction ingested from the contaminated source for the RME and CTE scenarios. For the RME scenario, the ingestion rate was set at 330 mg/day for the construction worker (USEPA, 2002c), 200 mg/day for the future child resident, and 100 mg/day for the other potential receptors (the maintenance/occupational worker, adolescent trespasser, and future adult resident; USEPA, 1993). Ingestion rates for the CTE are assumed to be one-half of the RME values.

Exposure parameters for the soil ingestion route are summarized in Tables 5-9 and 5-10 for RME and CTE, respectively.

Inhalation of Air Containing Fugitive Dust/Volatiles Emitted from Soil

The amount of chemical a receptor takes in as a result of respiration is determined using the concentration of the contaminant in air. Intakes of both particulates and vapors from soil were calculated using the following equation (USEPA, 1991 and 1996):

$$\text{Intake}_{ai} = [C_{si} \text{ x } IR_a \text{ x ET x EF x ED x } (1/\text{PEF} + 1/\text{VF})] / (\text{BW x AT})$$

where:	Intake_{ai}	=	intake of chemical "i" from air via inhalation (mg/kg/day)
	C_{si}	=	concentration of chemical "i" in soil (mg/kg)
	IR_a	=	inhalation rate (m^3/hr or day)
	ET	=	exposure time (hours/day)
	EF	=	exposure frequency (days/yr)
	ED	=	exposure duration (yr)
	PEF	=	Particulate Emission Factor (m^3/kg)
	VF	=	Volatilization Factor (chemical-specific) (m^3/kg)
	BW	=	body weight (kg)
	AT	=	averaging time (days);
			for noncarcinogens, AT = ED x 365 days/yr;
			for carcinogens, AT = 70 yr x 365 days/yr

The concentration of a chemical in air is calculated using the methodology provided in the USEPA's Soil Screening Guidance (USEPA, 1996 and 2002a) and measured soil concentrations, site-specific information such as the fraction of organic carbon (f_{oc}), chemical-specific data, and model default values.

Construction workers were evaluated for inhalation of fugitive dusts. The amount of a chemical that a receptor takes in as a result of respiration was determined using the concentration of the contaminant in air. Intakes of particulates were calculated using following equation (USEPA, 2009):

$$\text{Intake}_{ai} = \frac{(C_{ai})(\text{ET})(\text{EF})(\text{ED})}{(\text{AT})}$$

where: $Intake_{ai}$ = intake of chemical "i" from air via inhalation (mg/kg/day)

C_{ai} = concentration of chemical "i" in air (mg/m^3)

ET = exposure time

EF = exposure frequency

ED = exposure duration

AT = averaging time (days);
for non-carcinogens, AT = ED x 365 days/year x 24 hrs/day = 8,760 hrs
for carcinogens, AT = 70 years x 365 days/year x 24 hrs/day = 613,200 hrs

(Please note that "inhalation rate" is not a factor in the inhalation exposure calculation. The risk characterization compares site air concentrations of COPCs to the respective acceptable reference concentrations or inhalation unit risks, not calculated site inhalation exposure doses to reference doses and/or inhalation cancer slope factors.)

The concentrations of chemicals in air resulting from emissions from soil were developed following procedures presented in USEPA Soil Screening Guidance (USEPA, 2002a). The chemical concentration in air was calculated as follows:

$$C_{air} = C_{soil} \times \left[\frac{1}{PEF} + \frac{1}{VF} \right]$$

where:

C_{air} = chemical concentration in air, mg/m^3

C_{soil} = chemical concentration in soil, mg/kg

PEF = particulate emission factor, m^3/kg

VF = volatilization factor, m^3/kg

The particulate emissions factor (PEF) relates the concentration of a chemical in soil with the concentration of dust particles in air. The PEF for construction workers (1.27 x 10^6 m^3/kg) was calculated using the equations presented in the supplemental SSL guidance document (USEPA, 2002a). The PEF for wind-generation of particulates from soil (1.3 x 10^{-9} m^3/kg) was calculated according to USEPA guidance (USEPA, 1996). A sample calculation of these PEFs is presented in Appendix G.

5.4.5.2 Exposure to Groundwater

Dermal Contact with Groundwater

Dermal contact with groundwater was evaluated by methods and equations provided in RAGS Part E (USEPA, 2004). Direct contact with groundwater at Site 21 is limited to exposure that would occur under hypothetical future residential and construction/excavation scenarios. Hypothetical future onsite residential receptors are assumed to use groundwater for domestic purposes (i.e., bathing, showering, and dish washing) that can result in dermal exposure. Short-term dermal exposure was assumed to occur for the construction worker during excavation activities. Groundwater at Site 21 is not currently used as a source of potable water and is not expected to be used for this purpose in the future. The applicable groundwater exposure frequencies, exposure durations, and body weights for the receptors were identical to those previously identified for soil contact

The following equation was used to assess exposures resulting from dermal contact with water (USEPA, 2004):

$$DADwi = [(DAevent)(EV)(ED)(EF)(A)] / [(BW)(AT)]$$

where:

DAD_{wi}	=	dermally absorbed dose of chemical "i" from water (mg/kg/day)
DA_{event}	=	absorbed dose per event (mg/cm^2-event)
EV	=	event frequency (events/day)
ED	=	exposure duration (year)
EF	=	exposure frequency (days/year)
A	=	skin surface area available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days); for non-carcinogens, AT = ED x 365 days/year; for carcinogens, AT = 70 yrs x 365 days/year

The exposed surface area of construction workers is based on assumed activities and on the assumptions outlined for dermal contact with soil. Current guidance (USEPA, 2004) was used to develop the following default assumptions concerning the amount of skin surface area available for contact for a receptor:

- For construction workers assumed exposed to groundwater, the surface area for RME and CTE was assumed to be 3,300 cm^2, the value recommended for soil contact in USEPA's dermal guidance (USEPA, 2004).

- Dermal intakes for residents were assumed total body exposure, 6,600 cm^2 for children (0 to 6 years of age) and 18,000 cm^2 for adults (USEPA, 2004).

The absorbed dose per event (DA_{event}) was estimated using a nonsteady-state approach for organic compounds and a traditional steady-state approach for inorganics. For organics, the following equations apply:

$$\text{If } t_{event} < t^*\text{, then: } DA_{event} = (2FA)(K_p)(C_{gw})(CF)\left(\sqrt{\frac{6\,\tau\,t_{event}}{\pi}}\right)$$

$$\text{If } t_{event} > t^*\text{, then: } DA_{event} = (FA)(K_p)(C_{gw})(CF)\left(\frac{t_{event}}{1+B} + 2\tau\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right)$$

where:

t_{event}	=	duration of event (hours/event)
t^*	=	time it takes to reach steady-state conditions (hours)
FA	=	fraction absorbed (dimensionless)
K_p	=	permeability coefficient from groundwater through skin (cm/ hours)
C_{gw}	=	concentration of chemical "i" in groundwater (mg/L)
τ	=	lag time (hours)
π	=	constant (dimensionless; equal to 3.1416)
CF	=	conversion factor (1×10^{-3} L/cm^3)
B	=	partitioning constant derived by Bunge Model (dimensionless)

The estimated length of time for a shower or bath is 10 minutes for CTE and 15 minutes for RME. Receptors are assumed to spend an additional 5 minutes in the bathroom following their shower or bath. Construction/excavation workers were assumed to be exposed to shallow groundwater in a trench 4 hours per day for the RME and 2 hours per day for CTE. An event frequency of one per day is assumed for CTE and RME (i.e., residents were assumed to take one shower or bath per day).

Values for the chemical-specific parameters (t^*, K_p, T, and B) were obtained from the USEPA dermal guidance (USEPA, 2004).

The following steady-state equation was used to estimate DA_{event} for inorganics:

$$DA_{event} = (K_p)\,(C_{gw})\,(t_{event})$$

The recommended default value of 1×10^{-3} was used for the dermal permeability of inorganic constituents, unless a chemical-specific value was provided in USEPA guidance. For most metals, dermal absorption is not a significant pathway because penetration through the skin is minimal.

Ingestion of Groundwater

Residents may be exposed to groundwater via direct ingestion, and intakes associated with ingestion of groundwater were evaluated using the following equation (USEPA, 1989):

$$Intake_{wi} = \frac{(C_{wi})(IR_w)(EF)(ED)}{(BW)(AT)}$$

where:

$Intake_{wi}$	=	intake of chemical "i" from water (mg/kg/day)
C_{wi}	=	concentration of chemical "i" in water (mg/L)
IR_w	=	ingestion rate for ground water (L/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (year)
BW	=	body weight (kg)
AT	=	averaging time (days); for non-carcinogens, AT = ED x 365 days/year; for carcinogens, AT = 70 years x 365 days/year

Water ingestion rates for the adult resident were specified as 2.0 liters per day (RME) and 1.4 liters per day (CTE). For the child resident, water ingestion rates were 1.5 liters per day (RME) and 0.66 liters per day (CTE). The same exposure frequencies and durations used to assess dermal exposure to water were used to estimate intakes for ingestion of water.

Exposure parameters for exposure to groundwater are summarized in Tables 5-9 and 5-10, for RME and CTE, respectively.

Inhalation of Volatiles through Hypothetical Domestic Groundwater Use

Groundwater exposure may also result in inhalation of volatiles, typically for residential receptors who may be exposed while showering, bathing, washing dishes, etc. Inhalation exposures were estimated using a mass transfer model developed specifically for this exposure route in combination with an air intake estimation model. The mass transfer model accounts for inhalation that occurs during a shower and after a shower while the receptor remains in the closed bathroom. The method used was as follows (Foster and Chrostowski, 1987):

$$Intake_{si} = (S)(IR_{sh})(K)(EF)(ED)/(BW)(AT)(R_a)(CF)$$

$$K = D_s + \frac{\exp(-R_a \times D_t)}{R_a} - \frac{\exp R_a \times (D_s - D_t)}{R_a}$$

where:

$Intake_{wi}$	=	intake of chemical "i" from water via inhalation (mg/kg/day)
S	=	volatile chemical generation rate (µg/m³-min - shower)
IR_{sh}	=	inhalation rate (L/min)
K	=	mass transfer coefficient (min)
EF	=	exposure frequency (showers/yr)
ED	=	exposure duration (yr)
BW	=	body weight (kg)
AT	=	averaging time or period of exposure (days)
R_a	=	air exchange rate (min^{-1})
CF	=	conversion factor (1×10^6 µg-L/mg-m³)
D_s	=	shower duration (min)
D_t	=	total time in bathroom (min)

The estimated volatile chemical generation rate is based on two-phase film theory. The model uses contaminant-specific mass transfer coefficients, Henry's Law constants, droplet diameter, drop time, viscosity, and temperature. Shower inhalation rates are set at 10 L/min for adult and child residents (USEPA, 1989). The shower model calculations are presented in an Appendix G to the risk assessment.

Inhalation of Volatiles via Vapor Intrusion into Indoor Air

Volatilization of chemicals from groundwater into indoor air may occur, thereby exposing individuals inside buildings or dwellings. However, since no VOCs were above the vapor intrusion screening criteria, no VOCs were retained as COPCs for vapor intrusion at this site. Therefore, it was determined that a quantitative evaluation was not required because the potential risks associated with this pathway were regarded as minimal, and no further evaluation was performed.

Exposure of Workers to Volatiles in a Construction/Utility Trench

There are no well-established models available for estimating migration of volatiles from groundwater into a construction/utility trench. This risk assessment used an approach suggested by the Virginia Department of Environmental Quality (VDEQ, accessed online at http://www.deq.state.va.us/vrprisk/raguide.html, 2007) that is based on a combination of a vadose zone model to estimate volatilization of gases from contaminated groundwater into a trench, and a box model to estimate dispersion of the contaminants from the air inside the trench into the above-ground atmosphere to estimate the EPC for air in a construction trench.

The airborne concentration of a contaminant in a trench was estimated using the following equation:

$$C_{trench} = C_{GW} \times VF$$

where: C_{trench} = air concentration of contaminant in the trench (µg/m^3)
C_{GW} = concentration of contaminant in groundwater (µg/L)
VF = volatilization factor (L/m^3)

The model used in this risk assessment assumes that a construction project could result in an excavation to 15 feet bgs or less. If the depth to groundwater at a site is less than 15 feet, the VDEQ model assumes that a worker would encounter groundwater when digging an excavation or a trench. The worker would then have direct exposure to the groundwater. The worker would also be exposed to contaminants in the air inside the trench that would result from volatilization from the groundwater pooling at the bottom of the trench.

The following equation was used to calculate VF for a trench less than 15 feet deep:

$$VF = (K_i \times A \times F \times 10^{-3} \times 10^{4} \times 3{,}600) / (ACH \times V)$$

where: K_i = overall mass transfer coefficient of contaminant (cm/s)
A = area of the trench (m^2)
F = fraction of floor through which contaminant can enter (unitless)
ACH = air changes per hour = 2 h^{-1}
V = volume of trench (m^3)

10^{-3}	=	conversion factor (L/cm^3)
10^4	=	conversion factor (cm^2/m^2)
3,600	=	conversion factor (seconds/hr)

Studies of urban canyons suggest that if the ratio of trench width to trench depth, relative to wind direction, is less than or equal to 1, a circulation cell or cells will be set up within the trench that limits the degree of gas exchange with the atmosphere, and the ACH is assumed to be 2/hr based on measured ventilation rates of buildings. If the ratio of trench width to trench depth is greater than 1, air exchange between the trench and above-ground atmosphere is not restricted, and ACH is assumed to be 360/hr based upon the ratio of trench depth to the average wind speed. The risk assessment assumed that the trench width to depth ratio is less than 1 and the ACH is assumed to be 2 hr^{-1}.

The overall mass transfer coefficient (K_i) was calculated as follows:

$$K_i = 1 / \{(1/k_iL) + [(RT) / (H_i\ k_iG)]\}$$

where:	k_iL	=	liquid-phase mass transfer coefficient of i cm/s
	R	=	ideal gas constant (atm-m^3/mole-°K) = 8.2×10^{-5}
	T	=	average system absolute temperature (°K) (Default = 298°K)
	H_i	=	Henry's Law constant of i (atm-m^3/mol)
	k_iG	=	gas-phase mass transfer coefficient of i (cm/s)

where:	k_iL	=	$(MWO_2/MWi)^{0.5} \times (T/298) \times kL,O_2$
	k_iL	=	liquid-phase mass transfer coefficient of component i (cm/s)
	MWO_2	=	molecular weight of O_2 (g/mol)
	MW_i	=	molecular weight of component i (g/mol)
	kL,O_2	=	liquid-phase mass transfer coefficient of oxygen at 25°C (cm/s)

The value of kL, O_2 is 0.002 cm/s.

$$k_iG = (MWH_2O/MW_i)^{0.335} \times (T/298)^{1.005} \times kG, H_2O$$

where:	kiG =	gas-phase mass transfer coefficient of component i (cm/s)
	MWH_2O =	molecular weight of water (g/mol)
	kG,H_2O =	gas-phase mass transfer coefficient of water vapor at 25°C (cm/s)

The value of kG, H_2O is 0.833 cm/s

Exposures for construction workers associated with the inhalation route were estimated in the following manner (USEPA, 1989):

$$\text{Intake}_{\text{trenchi}} = \frac{(C_{\text{trenchi}})(IR_a)(ET)(EF)(ED)}{(BW)(AT)}$$

where:	$\text{Intake}_{\text{trenchi}}$	=	intake of chemical "i" from air via inhalation (mg/kg/day)
	C_{trenchi}	=	concentration of chemical "i" in air (mg/m^3)
	IR_a	=	inhalation rate (m^3/hr) = 2.5 m^3/hr (USEPA, 2002c)
	ET	=	exposure time (hours/day)
	EF	=	exposure frequency (days/yr)
	ED	=	exposure duration (yr)
	BW	=	body weight (kg)
	AT	=	averaging time (days) for noncarcinogens, AT = ED x 365 days/yr for carcinogens, AT = 70 yr x 365 days/yr

Input assumptions for the volatilization from groundwater to outdoor air model are presented in Appendix G. Site-specific values were used whenever possible. Model default values were used when they are believed to be representative of site conditions. Chemical properties were obtained primarily from the Soil Screening Guidance (USEPA, 2002a).

5.4.5.3 Exposure to Lead

The maximum concentrations of lead in subsurface soil, and groundwater are below the residential screening criteria for lead, and the maximum concentration of lead in surface soil is only slightly above the residential screening value (428 mg/kg vs. 400 mg/kg). However, the lead mean concentrations (which USEPA guidance utilizes for risk evaluations) in all media (surface soil, subsurface soil, and groundwater) are well below the residential screening value. Given that the averages are well below the screening levels, and that this would result in Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK) and Adult Lead Methodology (ALM) risk evaluations well below acceptable risk results, lead was not retained as a COPC for either soil or groundwater at Site 21. Therefore, it was determined that a quantitative evaluation was not required because the potential risks associated with this COPC were regarded as minimal, and no further evaluation was performed.

5.5 TOXICITY ASSESSMENT

Oral and inhalation RfDs and CSFs used in the HHRA for Site 21 were obtained from the following primary literature sources (USEPA, 2003):

- Integrated Risk Information System (IRIS) (online at http://www.epa.gov/iris/subst/index.html).
- USEPA Provisional Peer Reviewed Toxicity Values (PPRTVs) – The Office of Research and Development/National Center for Environmental Assessment (NCEA) Superfund Health Risk Technical Support Center develops PPRTVs on a chemical-specific basis when requested by the USEPA's Superfund program.
- Annual Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997b for chronic and subchronic toxicity values.
- Other Toxicity Values – These sources include but are not limited to California Environmental Protection Agency (Cal EPA) toxicity values.
- The Risk Assessment Information System (RAIS) (online at http://rais.ornl.gov/tox/toxvals.shtml) for subchronic toxicity values.

Although RfDs and CSFs can be found in several toxicological sources, USEPA's IRIS online database is the preferred source for toxicity values. ORNL RSLs and the Annual Health Effects Summary Tables (HEAST, 1997b), as well as the PPRTVs, were used as sources of toxicity criteria, and guidance provided in RAGS-Part C (USEPA, 1991b) was used when evaluating subchronic risks for the construction worker. RfDs and CSFs for the constituents selected as COPCs for Site 21 are presented in Tables 5-11 through 5-14 (i.e., RAGS Part D tables; Table 5s and 6s).

5.5.1 Toxicity Criteria for Dermal Exposure

RfDs and CSFs found in literature are typically expressed as administered doses; therefore, these values are considered inappropriate for estimating the risks associated with dermal routes of exposure. Oral dose-response parameters based on administered doses must be adjusted to absorbed doses before the evaluation of estimated dermal exposure intakes is made.

The adjustment from administered to absorbed dose was made using chemical-specific absorption efficiencies published in available guidance [i.e., USEPA, 2004 (the primary reference), IRIS, Agency for Toxic Substances and Disease Registry (ATSDR) toxicological profiles, etc.] and the following equations:

$$RfD_{dermal} = (RfD_{oral})(ABS_{GI})$$

$$CSF_{dermal} = (CSF_{oral}) \;/\; (ABS_{GI})$$

where: ABS_{GI} = absorption efficiency in the gastrointestinal tract

Absorption efficiencies used in the Site 21 HHRA reflect USEPA's current dermal assessment guidance (USEPA, 2004).

5.5.2 Toxicity Criteria for Chromium

Toxicity criteria are available for two different forms of chromium, the trivalent state and the hexavalent state, of which the latter is considered to be more toxic. The screening of chromium was conducted assuming that 100 percent of the reported total chromium concentration is hexavalent. This is likely a conservative assumption, and the uncertainty associated with the assumption that all chromium is hexavalent chromium will be discussed in the uncertainty section of the HHRA.

5.5.3 Toxicity Criteria for Carcinogenic Effects of PAHs

Limited toxicity values are available to evaluate the carcinogenic effects from exposure to PAHs. The most extensively studied PAH is BaP, which is classified by USEPA as a probable human carcinogen. Although CSFs are available for BaP, insufficient data are available to calculate CSFs for other carcinogenic PAHs. Toxic effects for these chemicals were evaluated using the concept of estimated orders of potential potency, which relate the potency of the other potentially carcinogenic PAHs to the potency of BaP, as presented in current USEPA guidance (USEPA, 1993). The equivalent oral and inhalation CSFs for these chemicals were derived by multiplying the CSFs for BaP by the orders of potential potency. Inhalation unit risk values for non-BaP carcinogenic PAHs were obtained from the California EPA.

USEPA currently incorporates the use of age-dependent adjustment factors for carcinogens that act via a mutagenic mode of action. Carcinogenic PAHs were evaluated following USEPA's Guidelines for Carcinogen Risk Assessment (USEPA, 2005b) and Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005a).

5.6 RISK CHARACTERIZATION

The baseline HHRA evaluated potential health risks associated with human exposure to chemicals present at Site 21. Quantitative risk estimates are based on the conservative assumption that an individual is exposed to multiple COPCs by multiple exposure pathways. In accordance with USEPA guidance, chemical- and pathway-specific risks were summed to provide estimates of total risk for a given receptor. Risk estimates were developed by integrating chemical intake levels with chemical-specific toxicity factors. Calculating risks for surface and subsurface soil separately would double the exposure that is assumed; therefore, the risks and HIs between surface and subsurface soil are averaged, then added to the total risk calculated for groundwater to achieve the overall risk summaries. Risk example calculations are provided in Appendix G.

ILCR estimates were generated for each COPC using estimated exposure intakes and published CSFs, as follows:

$$\text{ILCR} = \text{Estimated Exposure Intake} \times \text{CSF}$$

An ILCR of 1×10^{-6} indicates that the exposed receptor has a one-in-one-million chance of developing cancer from exposure to site COPCs under the defined exposure scenario. Alternatively, such a risk may be interpreted as representing one additional case of cancer in an exposed population of one million people.

Non-carcinogenic risks are assessed using the concept of HQs and hazards indices (HIs). The HQ for a COPC is the ratio of the estimated intake to the RfD, as follows:

$$\text{HQ} = (\text{Estimated Exposure Intake})/(\text{RfD})$$

An HI for a given exposure route is generated by summing the individual HQs for the COPCs. The HI is not a mathematical prediction of the severity of toxic effects and is therefore not a true risk. It is simply a numerical indicator of the possibility of the occurrence of non-carcinogenic (threshold) effects.

5.6.1 Comparison of Quantitative Risk Estimates to Benchmarks

To interpret the quantitative risks and to aid risk managers in determining the need for remediation at a site, quantitative risk estimates were compared to typical benchmarks. USEPA has defined the range of 1×10^{-4} to 1×10^{-6} as the ILCR target range for hazardous waste facilities addressed under CERCLA. The Illinois EPA goal for carcinogenic risks, as specified in TACO Tier 1 and 2, is 1×10^{-6}, and for TACO Tier 3 (i.e., site-specific risk assessment) it is the range of 1×10^{-4} to 1×10^{-6}.

An HI exceeding unity (1.0) indicates that there may be potential non-carcinogenic health risks associated with exposure. If an HI exceeds unity, target organ effects associated with exposure to COPCs are segregated (and the HI is calculated on a target organ/target effect basis). Only those chemicals that affect the same target organ(s) or exhibit similar critical effect(s) are regarded as truly additive. Consequently, it may be possible for a cumulative HI to exceed 1.0, but no adverse health effects are anticipated if the COPCs do not affect the same target organ or exhibit the same critical effect. Individual target organ HIs for the receptors are presented in Appendix G.

5.6.2 Risk Assessment Results

The baseline HHRA conducted for Site 21 evaluated the risks potentially incurred by site maintenance/occupational workers, adolescent trespassers, construction workers, and hypothetical future residents. Both RME and CTE scenarios were evaluated. Tables 5-15 and 5-16 contain a summary of the estimated risks, with and without groundwater included, for Site 21 for the RME and CTE, respectively (RAGS Part D tables; Table 9s). Calculations of the detailed chemical-specific risks for Site 21 are included in Appendix G. The following sections discuss the results of the risk characterization.

5.6.2.1 Carcinogenic Risks - RME

Quantitative estimates of carcinogenic effects are presented in the form of ILCRs. The target risk range for carcinogenic effects, as defined by the USEPA and Illinois TACO Tier 3, is between $1x10^{-4}$ and $1x10^{-6}$. The Illinois EPA goal for carcinogenic risks, as specified in TACO Tier 1 and 2, is $1x10^{-6}$. Estimated ILCRs for Site 21 are discussed in the following subsections. The carcinogenic risks calculated for the RME case are in Table 5-15 (RAGS Part D tables; Table 9s).

Carcinogenic Risks for Exposure to Surface Soil - RME

The ILCR for construction workers ($4x10^{-6}$) was within the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects of $1x10^{-4}$ and $1x10^{-6}$ but greater than the Illinois EPA TACO Tier 1 and 2 goal of $1x10^{-6}$ under the defined RME conditions. The elevated risk in the construction worker receptor is due to c-PAHs in surface soil.

The ILCR for maintenance/occupational workers ($8x10^{-5}$) was within the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects of $1x10^{-4}$ and $1x10^{-6}$, but greater than the Illinois EPA TACO Tier 1 and 2 goal of $1x10^{-6}$. The elevated risk in the occupational/maintenance worker receptor is predominantly attributed to arsenic and c-PAHs in surface soil.

The ILCR for adolescent trespassers ($1x10^{-5}$) was within the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects of $1x10^{-4}$ and $1x10^{-6}$, but greater than the Illinois EPA TACO Tier 1 and 2 goal of $1x10^{-6}$. The elevated risk in the adolescent trespasser receptor is predominantly attributed to c-

PAHs in surface soil. However, it should be noted that this is a hypothetical receptor, since under current conditions the surface soils of Site 21 are covered by buildings and pavement.

The total ILCR for hypothetical future residents (adult + child) exposure to surface soil was $4x10^{-3}$, which is greater than the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects of $1x10^{-4}$ and $1x10^{-6}$, and the Illinois EPA TACO Tier 1 and 2 goal of $1x10^{-6}$. The residential risk is primarily attributed to exposure to carcinogenic c-PAHs and arsenic in surface soil.

Carcinogenic Risks for Exposure to Subsurface Soil - RME

The ILCR for construction workers ($3x10^{-6}$) was within the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects of $1x10^{-4}$ and $1x10^{-6}$, but greater than the Illinois EPA TACO Tier 1 AND 2 goal of $1x10^{-6}$ under the defined RME conditions. The elevated risk in the construction worker receptor is attributed to c-PAHs in subsurface soil.

The total ILCR for hypothetical future residents (adult + child) exposure to subsurface soil was $3x10^{-3}$, which is greater than the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects of $1x10^{-4}$ and $1x10^{-6}$, and the Illinois EPA TACO Tier 1 and 2 goal of $1x10^{-6}$. The residential risk is primarily attributed to exposure to c-PAHs and arsenic in subsurface soil.

Carcinogenic Risks for Exposure to Groundwater - RME

The ILCR for construction workers ($8x10^{-9}$) was less than the target risk goal of $1x10^{-6}$.

Domestic use of groundwater at Site 21 is not expected to occur under current and/or future land uses because the facility and surrounding area are supplied by public water, the facility has a groundwater use restriction in place, and there are no drinking water wells located immediately downgradient of the site. However, the residential groundwater scenario was evaluated based on the assumption that groundwater at the site will be used as a source of domestic drinking water in the future for risk management purposes. The total ILCR ($3x10^{-4}$) for hypothetical future residents (adult + child) for groundwater use is greater than the USEPA target risk range and Illinois EPA goal for carcinogenic effects. The residential risk is primarily attributed to exposure to c-PAHs, arsenic, and dioxins by ingestion of groundwater.

5.6.2.2 Non-Carcinogenic Effects - RME

Quantitative estimates of non-carcinogenic (toxic) effects are presented in the form of HQs and HIs. As discussed above, the risk benchmark for HQs and HIs (calculated on a target organ-specific basis) is 1 (USEPA, 1989). Estimated HQs and HIs for Site 21 are discussed below and summarized in Table 5-15.

Non-Carcinogenic Risks for Exposure to Surface Soil - RME

The cumulative HIs for adolescent trespassers (HI = 0.05), maintenance/occupational workers (HI = 0.3), and future adult residents (HI = 0.9) were less than unity (1.0), indicating that adverse non-carcinogenic health effects are not anticipated for these receptors under the defined RME conditions.

The cumulative HI for the future child resident (HI = 8) exceeded unity. The major contributor to the child resident HI was arsenic and iron by ingestion (HQ = 8).

The cumulative HI for construction workers (HI = 13) exceeded unity. The major contributor to the construction worker HI was manganese by inhalation of particulates (HQ = 12). It should be noted that the soil EPCs for the construction worker are conservatively assumed to be the maximum detected concentrations of COPCs. In addition, for manganese in surface soil maximum detection is 2,420 mg/kg, which is an apparent outlier in a data set with a mean of 590 mg/kg and 95 percent UCL of 770 mg/kg.

Non-Carcinogenic Risks for Exposure to Subsurface Soil - RME

The cumulative HI for construction workers (HI = 10) exceeded unity. The major contributor to the construction worker HI was manganese by inhalation of particulates (HQ = 9).

The cumulative HI for the future child resident (HI = 8) exceeded unity. The major contributor to the child resident HI was arsenic, cobalt, and iron by ingestion (HQ = 7).

Non-Carcinogenic Risks for Exposure to Groundwater - RME

The cumulative groundwater HI for construction workers (HI = 0.4) was less than unity, indicating that adverse non-carcinogenic health effects are not anticipated for this receptor under the defined RME condition.

The cumulative HIs for adult and child residents (23 and 7) exceeded unity. However, the groundwater risks were based on assumed exposure to maximum detected concentrations, and exposure to groundwater at Site 21 is not expected to occur under current and/or future land uses.

5.6.2.3 Carcinogenic Risks - CTE

As discussed previously, an evaluation of the potential risks associated with the CTE scenario is included to provide a measure of the central, or average, case exposure. Estimated HQs and HIs for the CTE scenario for Site 21 are discussed below and summarized in Table 5-16.

Carcinogenic Risks for Exposure to Surface Soil - CTE

The ILCRs for construction workers ($2x10^{-7}$) and adolescent trespassers ($8x10^{-7}$) were less than the target risk goal of $1x10^{-6}$.

The ILCR for maintenance/occupational workers was $3x10^{-6}$, within the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects, but greater than the Illinois EPA TACO Tier 1 and 2 goal of $1x10^{-6}$.

The total ILCR for hypothetical future residents (adult + child) was $9x10^{-6}$, within the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects, but greater than the Illinois EPA TACO Tier 1 and 2 goal of $1x10^{-6}$.

Carcinogenic Risks for Exposure to Subsurface Soil - CTE

The ILCR for construction workers ($1x10^{-7}$) was less than the target risk goal of $1x10^{-6}$.

The total ILCR for hypothetical future residents (adult + child) was $7x10^{-6}$, within the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects, but greater than the Illinois EPA TACO Tier 1 and 2 goal of $1x10^{-6}$.

Carcinogenic Risks for Exposure to Groundwater - CTE

The ILCR for construction workers ($5x10^{-9}$) was less than the target risk goal of $1x10^{-6}$.

The total residential ILCR ($4x10^{-5}$) was within the USEPA and Illinois EPA TACO Tier 3 target risk range for carcinogenic effects of $1x10^{-4}$ and $1x10^{-6}$, but greater than the Illinois EPA goal of $1x10^{-6}$.

5.6.2.4 Non-Carcinogenic Effects - CTE

Non-Carcinogenic Risks for Exposure to Surface Soil - CTE

The cumulative HIs for maintenance/occupational workers (HI = 0.08), adolescent trespassers (HI = 0.008), future child residents (HI = 0.8) and future adult residents (HI = 0.08) were less than unity (1.0), indicating that adverse non-carcinogenic health effects are not anticipated for these receptors under the defined CTE conditions.

The cumulative HI for construction workers (HI = 2) exceeded unity. The major contributor to the construction worker HI was manganese by inhalation of particulates.

Non-Carcinogenic Risks for Exposure to Subsurface Soil - CTE

The cumulative HIs for future child residents (HI = 0.6) and future adult residents (HI = 0.07) were less than unity (1.0), indicating that adverse non-carcinogenic health effects are not anticipated for these receptors under the defined CTE conditions.

The cumulative HI for construction workers (HI = 2) exceeded unity. The major contributor to the construction worker HI was manganese by inhalation of particulates.

Non-Carcinogenic Risks for Exposure to Groundwater - CTE

The cumulative HI for construction workers (HI = 0.4) was less than unity (1.0), indicating that adverse non-carcinogenic health effects are not anticipated for these receptors under the defined CTE conditions.

The cumulative HIs for child and adult residents (HI = 10 and 5, respectively) exceeded unity. The major contributor was manganese by ingestion of groundwater for the adult, and manganese, cobalt and iron for the child. However, the groundwater risks were based on the assumed exposure to maximum detected concentrations, and exposure to groundwater at Site 21 is not expected to occur under current and/or future land use.

5.7 UNCERTAINTY ANALYSIS

The baseline HHRA for Site 21 was performed in accordance with current USEPA and Illinois EPA guidance. However, there are varying degrees of uncertainty associated with the baseline HHRA. This section presents a brief summary of uncertainties inherent in the HHRA and includes a discussion of how they may affect the quantitative risk estimates and conclusions of the risk analysis.

5.7.1 General Uncertainty in Risk Assessment

Uncertainty in the selection of COPCs is related to the current status of the predictive databases, grouping of samples, and procedures used to include or exclude constituents as COPCs. Uncertainty associated with the exposure assessment includes the values used as input variables for a given intake route or scenario, assumptions made to determine EPCs, and predictions regarding future land use and population characteristics. Uncertainty in the toxicity assessment includes the quality of the existing toxicity data needed to support dose-response relationships, and weight of evidence used to determine the carcinogenicity of COPCs. Uncertainty in risk characterization includes that associated with exposure to multiple chemicals, and the cumulative uncertainty from combining conservative assumptions made in earlier steps of the HHRA process.

Whereas there are various sources of uncertainty, the direction of uncertainty can be influenced by the assumptions made throughout the HHRA, including selection of COPCs and selection of values for dose-response relationships. To account for uncertainties in the development of a HHRA, conservative estimates must be made to make sure that the particular assumptions made are protective of sensitive subpopulations and maximum exposed individuals. Therefore, throughout the entire HHRA, assumptions that consider safety factors are made so that the final calculated risks are overestimated, and consequentially, very conservative.

The major sources of uncertainty associated with this HHRA are discussed below.

5.7.2 Uncertainty in Selection of COPCs

A minor amount of uncertainty is associated with the selection of COPCs that may affect the numerical risk estimates presented in the HHRA. The most significant issues related to uncertainty in COPC selection are the existing database (i.e., the use of validated or unvalidated sample results), the biased selection of sampling locations, inclusion of chemicals potentially attributable to background, screening levels used, and absence of screening levels for a few chemicals detected in the site media. A brief discussion of each of these issues is provided in the remainder of this section.

5.7.2.1 Existing Databases

The data used in the HHRA were based on the most recent analytical data collected at Site 21 during SI field activities. No historical data were used for HHRA purposes. The analytical data were validated according to the methodologies specified in the Site 21 SI Work Plan (Tetra Tech, 2010). The qualification of data during the formal data validation process is not expected to compromise the results of the HHRA. Analytical data qualified as estimated were utilized, even though the reported concentrations or sample-specific quantitation limits may be somewhat imprecise. The use of estimated data adds to the uncertainty associated with the HHRA. However, the associated uncertainty is expected to be negligible compared to the other uncertainties inherent in the risk evaluation process (i.e., uncertainties with land uses, exposure scenarios, toxicological criteria, etc.). When determining exposure concentrations via statistical procedures, chemicals not detected were conservatively assumed to be present at concentrations equal to the sample-specific detection limits. Analytical results for chemicals qualified "R," rejected, were not used in the risk assessment.

5.7.2.2 Biased Selection of Sampling Locations

Soil boring and sample locations were selected to assist in detecting soil and groundwater contamination throughout the intended study area and used to conduct this risk assessment. Sample locations were biased toward areas where waste may have been placed in the past. The biased data collection strategy was designed to prevent overlooking a potential unacceptable human health risk. However, this most likely also overestimates the risks to potential receptors.

5.7.2.3 Chemicals Potentially Attributable to Background

No chemicals in soil and groundwater were eliminated as COPCs on the basis of comparisons to background concentrations.

5.7.2.4 COPC Screening Levels

The use of risk-based screening levels for soil and groundwater based on conservative residential land use scenarios corresponding to ILCRs of 1×10^{-6} and HIs of 0.1 should make certain that the significant contributors to risk from a site are evaluated. The elimination of chemicals that are present at concentrations that correspond to ILCRs less than 1×10^{-6} and HIs less than 0.1 should not affect the final conclusions of the HHRA, because these chemicals are not expected to cause a potential health concern at the concentrations detected.

5.7.2.5 Absence of COPC Screening Levels

Because of the lack of toxicity criteria, risk-based screening levels are currently not available for a few constituents detected at Site 21 (e.g., benzo(g,h,i)perylene, etc.). Therefore, screening levels available for surrogate chemicals were used as screening levels for these constituents. The use of these surrogates may increase the uncertainty in the HHRA. The direction of bias cannot be determined.

5.7.3 Uncertainty in the Exposure Assessment

Uncertainty in the exposure assessment can arise because of the methods used to calculate EPCs, determination of land use conditions, and selection of exposure parameters. Each of these is discussed below.

5.7.3.1 Exposure Point Concentrations

Uncertainty is associated with the use of the 95-percent UCL on the mean concentration as the EPC, as was done in the evaluation of the soil data. As a result of using the 95-percent UCL, the estimations of potential risk are most likely to be overestimated because this is a representation of the upper limit to which potential receptors would be exposed over the entire exposure period. The maximum concentration is also used when the UCL is greater than the maximum concentration: in the soil data evaluation for construction workers and residents for the RME scenario, and in the groundwater data evaluation for the RME scenario. The use of the maximum concentration as the EPC tends to overestimate potential risks because receptors are assumed to be exposed continuously to the maximum concentration for the entire exposure period, which is very unlikely. Moreover, many of the maximum results of COPCs are not representative of the entire soil dataset for a specific COPC, but are rather high outliers. For example, the maximum detected concentration of benzo(a)pyrene equivalents in subsurface soil (39.4 mg/kg) is nearly an order of magnitude greater than the next highest concentration (4.7 mg/kg) and 50 times higher than 19 of 22 subsurface soil samples. Therefore, theoretical excess lifetime cancer risks for construction workers and residents are likely overestimated given the application of the maximum detected subsurface soil concentration of BaP Equivalents as the EPC. Inclusion of such high outlier maximum concentrations also will yield the calculation of relatively high mean and 95 percent UCL of the mean concentrations, potentially resulting in an overestimation of risks for scenarios that use statistical values as EPCs. For example, the maximum detected concentration of manganese in surface soil samples (2,420 mg/kg) is two times greater than the next three highest sample concentrations (1250, 1070, 965 mg/kg), and is an outlier for the dataset at the 10percent, 5 percent, and 1 percent significance levels (ProUCL, 2010). The 95 percent UCL with the inclusion of the maximum detection is 769 mg/kg, while the 95 percent UCL of the dataset without the maximum (high outlier) is 626 mg/kg.

Uncertainty is also introduced when non-detected results are assigned a value of the quantitation limit when calculating the EPC. This most likely also overestimates the risks to potential receptors because most of these values would be lower than the detection limit.

5.7.3.2 Land Use

Uncertainty and conservatism may be introduced into the HHRA when estimated risks are not based on current land use patterns. The risks calculated in this HHRA are based on current and potential projected future land use at Site 21. However, a large source of conservatism in this HHRA is related to groundwater usage, especially in the future residential scenarios. This HHRA assumes that groundwater is used as a source of future domestic drinking water. However, groundwater is not currently used for this purpose, and it is unlikely that groundwater at the site would ever be used as a source of potable water in the future. Because of this, the inclusion of this pathway most likely overestimates the risks to potential residential receptors.

Therefore, in this HHRA, total risk estimates for the residential scenarios were calculated both with and without the groundwater pathway included, for comparison and risk management purposes. A discussion of the difference in these risk calculations is included in the Summary section (Section 5.8).

5.7.3.3 Exposure Parameters

Each exposure factor selected for use in the HHRA contains some associated uncertainty. Generally, exposure factors are based on surveys of physiological and lifestyle profiles across the United States. The attributes and activities studied in these surveys generally have a broad distribution. To avoid underestimation of exposure, USEPA guidelines (e.g., USEPA, 1991b) for the RME receptor were used, if applicable, which generally specify the use of the 95^{th} percentile for most parameters. Therefore, the selected exposure factors for the RME receptor represent the upper bound of the observed or expected practices that are characteristic of the majority of the population. Because USEPA does not provide values for exposure factors for some receptors/pathways, professional judgment was used to determine some values. When using professional judgment, an effort was made to be reasonably conservative. However, the use of professional judgment adds uncertainty to the HHRA.

Generally, uncertainty can be assessed for many assumptions made in determining factors for calculating exposures and intakes. Many of these parameters were determined from the statistical analyses of human population characteristics. Often, the database used to summarize a particular exposure parameter (i.e., body weight) is quite large. Consequently, the values chosen for such variables in the RME scenario have low uncertainty. For many parameters for which limited information exists (e.g., dermal absorption), greater uncertainty exists. For example, current USEPA guidance (USEPA, 2004) does not provide dermal absorption factors for exposure to most metals (except arsenic and cadmium) and VOCs in soil. Therefore, risks for dermal contact with soil were not evaluated for metals other than arsenic and cadmium, or for VOCs. Consequently, risks from exposure to soil may be underestimated by omitting metals and VOCs from the dermal HHRA.

5.7.4 <u>Migration of Soil to Groundwater Pathway</u>

Maximum subsurface and surface soil concentrations were compared to the USEPA Generic soil-to-groundwater SSLs and Illinois EPA TACO and Non-TACO Migration to Groundwater Class I screening criteria. These results are summarized in Table 5-17 (a and b) for surface and subsurface soil, respectively.

The comparison shown in Table 5-17a indicates that two VOCs (benzene and tetrachloroethylene), two SVOCs (carbazole and bis(2-ethylhexyl)phthalate,), some PAHs (benzo(a)anthracene BaP, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, chrysene, 2-methylnaphthalene, and naphthalene), some pesticides (4,4-DDD, 4,4-DDE, 4,4-DDT, alpha-BHC, alpha-chlordane, beta-BHC, delta-BHC, dieldrin, gamma-chlordane, lindane, endrin, and heptachlor epoxide), one PCB (Aroclor-1260), some dioxins/furans (1,2,3,4,6,7,8,9-OCDD; 1,2,3,4,6,7,8-HPCDF; 1,2,3,4,6,7,8-HPCDD; 1,2,3,4,7,8-HXCDF; 1,2,3,6,7,8-HXCDD; 1,2,3,6,7,8-HXCDF; 1,2,3,7,8,9-HXCDD; 1,2,3,7,8,9-HXCDF; 1,2,3,7,8-PECDD; 2,3,4,6,7,8-HXCDF; 2,3,4,7,8-PECDF; 2,3,7,8-TCDF; and 2,3,7,8-TCDD), one herbicide (2,4-D), and several metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, silver, vanadium, and zinc) were detected in surface soil at concentrations that exceeded one or more of the screening criteria.

The comparison shown in Table 5-17b indicates that four VOCs (benzene, chloromethane, ethylbenzene, and tetrachloroethylene), SVOC carbazole, some PAHs (benzo(a)anthracene BaP, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, chrysene, 2-methylnaphthalene, and naphthalene), some pesticides (4,4-DDD, 4,4-DDE, 4,4-DDT, aldrin, alpha-BHC, alpha-chlordane, beta-BHC, delta-BHC, dieldrin, gamma-chlordane, lindane, and heptachlor epoxide), two PCBs (Aroclor-1260 and Aroclor-1242), some dioxins/furans (1,2,3,4,6,7,8,9-OCDD; 1,2,3,4,6,7,8-HPCDD; 1,2,3,6,7,8-HXCDD; 1,2,3,7,8-PECDD; 2,3,4,7,8-PECDF; and 2,3,7,8-TCDD), one herbicide (2,4-D), and metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, vanadium, and zinc) were detected in subsurface soil at concentrations that exceeded one or more of the screening criteria.

These exceedances of SSLs may indicate the potential for chemicals to leach to groundwater and impact water quality. However, the majority of the chemicals detected in soil at concentrations exceeding SSLs for migration from soil to groundwater were not detected in groundwater samples collected at the site (two of the VOCs, all the SVOCs, all the dioxins/furans, all the herbicides, all but three of the pesticides, and about two-thirds of the metals).

Based on the above discussion and knowledge of site history, the potential exists for chemicals detected in soil to adversely impact environmental media downgradient of Site 21; however, it is unlikely that the concentrations of constituents in soil would adversely impact groundwater quality. In addition, exposure to groundwater at Site 21 is not expected to occur under current and/or future land uses because the facility and the area surrounding the facility are supplied by public water, the facility has a groundwater use restriction in place, and there are no drinking water wells located immediately downgradient of the site.

5.7.5 <u>Uncertainty in the Toxicological Evaluation</u>

Uncertainties associated with the toxicity assessment (determination of RfDs and CSFs and use of available criteria) are presented in this section.

5.7.5.1 Derivation of Toxicity Criteria

Uncertainty associated with the toxicity assessment is associated with hazard assessment and dose-response evaluations for the COPCs. The hazard assessment deals with characterizing the nature and strength of the evidence of causation or the likelihood that a chemical that induces adverse effects in animals will also induce adverse effects in humans. Hazard assessment of carcinogenicity is evaluated as a weight-of-evidence determination using USEPA methods. Positive animal cancer test data suggest that humans contain tissue(s) that may manifest a carcinogenic response; however, the animal data cannot necessarily be used to predict the target tissue in humans. In the hazard assessment of non-cancer effects, however, positive animal data often suggest the nature of the effects (i.e., the target tissues and type of effects) anticipated in humans.

Uncertainty in hazard assessment arises from the nature and quality of the animal and human data. Uncertainty is reduced when similar effects are observed across species, strain, sex, and exposure route; when the magnitude of the response is clearly dose related; when pharmacokinetic data indicate a similar fate in humans and animals; when postulated mechanisms of toxicity are similar for humans and animals; and when the COC is structurally similar to other chemicals for which the toxicity is more completely characterized.

Uncertainty in the dose-response evaluation includes determination of a CSF for the carcinogenic assessment and derivation of an RfD or RfC for the non-carcinogenic assessment. Uncertainty is introduced from interspecies (animal-to-human) extrapolation which, in the absence of quantitative pharmacokinetic or mechanistic data, is usually based on consideration of interspecies differences in basal metabolic rate. Uncertainty also results from intraspecies variation. Most toxicity experiments are performed with animals that are very similar in age and genotype, so intragroup biological variation is minimal, but the human population of concern may reflect a great deal of heterogeneity including unusual sensitivity or tolerance to the COPC. Even toxicity data from human occupational exposures reflect a bias because only those individuals sufficiently healthy to attend work regularly (the "healthy worker effect") and those not unusually sensitive to the chemical are likely to be occupationally exposed. Finally, uncertainty arises from the quality of the key study from which the quantitative estimate is derived and the database. For cancer effects, the uncertainty associated with dose-response factors is mitigated by assuming the 95-percent upper bound for the CSF. Another source of uncertainty in carcinogenic assessment is the method by which data from high doses in animal studies are extrapolated to the dose range expected for environmentally exposed humans. The linearized multistage model, which is used in nearly all quantitative estimations of human risk from animal data, is based on a non-threshold assumption of carcinogenesis. Evidence suggests, however, that epigenetic carcinogens, as well as many genotoxic carcinogens, have a threshold below which they are non-carcinogenic. Therefore, the use of the linearized multistage model is conservative for chemicals that exhibit a threshold for carcinogenicity.

For non-cancer effects, additional uncertainty factors may be applied in the derivation of the RfD or RfC to mitigate poor quality of the key study or gaps in the database. Additional uncertainty for non-cancer effects arises from the use of an effect level in the estimation of an RfD or RfC because this estimation is predicated on the assumption of a threshold below which adverse effects are not expected. Therefore, an uncertainty factor is usually applied to estimate a no-effect level. Additional uncertainty arises in estimation of an RfD or RfC for chronic exposure from subchronic data. Unless empirical data indicate that effects do not worsen with increasing duration of exposure, an additional uncertainty factor is applied to the no-effect level in the subchronic study. Uncertainty in the derivation of RfDs is mitigated by the use of uncertainty and modifying factors that normally range between 3 and 10. The resulting combination of uncertainty and modifying factors may reach 1,000 or more.

The derivation of dermal RfDs and CSFs from oral values introduces uncertainty. This is particularly the case when chemical-specific gastrointestinal absorption rates are not available in the literature or when only qualitative statements regarding absorption are available.

5.7.5.2 Uncertainty Associated with Evaluation of the Dermal Exposure Pathway

According to RAGS Part E (USEPA, 2004), risks from dermal absorption from soil are to be quantitatively evaluated for arsenic, cadmium, chlordane, 2,4-dichlorophenoxyacetic acid, DDT, TCDD (and other dioxins), PAHs, PCBs, pentachlorophenol, and SVOCs because of the limited guidance available to estimate dermal absorption factors for other constituents. Of these, arsenic, cadmium, TCDD, PAHs, and PCBs are COPCs in soil. Therefore, the dermal route of exposure was evaluated quantitatively for these chemicals only. Risks for dermal exposure to metals (other than arsenic and cadmium) and VOCs identified as COPCs for soil were not quantified in the HHRA; consequently, potential risks may be underestimated by excluding these constituents from the dermal HHRA calculations.

Aqueous risks were calculated using a USEPA model presented in RAGS Part E (USEPA, 2004), which, according to the guidance, tends to overestimate intakes and risks for dermal contact for some chemicals (e.g., PAHs, PCBs). Because of the large uncertainties associated with dermal contact with water, risks from dermal absorption of PAHs, dioxins, and pentachlorophenol from groundwater were not evaluated in this HHRA. This may underestimate the risk estimates for groundwater. Appendices A and B of RAGS Part E discuss the uncertainties in the permeability coefficients for these chemicals and limitations of the dermal absorption model when evaluating chemicals.

5.7.5.3 Uncertainty Associated with Evaluation of Arsenic

In addition, human health HHRAs do not take into account the unique aspects of evaluating exposures to arsenic in soil. For example, risks from ingestion of arsenic in soil are often based on toxicity factors derived from studies of arsenic (soluble arsenate or arsenite) in drinking water. However, the toxicity of arsenic in drinking water cannot be directly extrapolated to toxicity of arsenic in soil because of differences in chemical form, bioavailability, and excretion kinetics. Because of the differences between soil arsenic and water arsenic, risks from arsenic in soil are likely to be lower than what would be calculated using default toxicity values for arsenic in drinking water (Valberg, 1997).

5.7.6 Uncertainty in the Risk Characterization

5.7.6.1 Uncertainty Associated with the Additivity of Effects

Uncertainty in risk characterization results primarily from assumptions made regarding additivity of effects from exposure to multiple COPCs from various exposure routes. High uncertainty exists when summing cancer risks for several substances across different exposure pathways. This assumes that each substance has a similar effect and/or mode of action. Often compounds affect different organs, have different mechanisms of action, and differ in their fate in the body, so additivity may not be an appropriate assumption. However, the assumption of additivity is made to provide a conservative estimate of risk. This may overestimate the risk.

5.7.6.2 Uncertainty Associated with the Risk Characterization of Surface and Subsurface Soil

Calculating risks for surface and subsurface soil separately doubles the exposure that is assumed because the dose calculations for both media apply the full default exposure factors. As this is an unrealistic scenario, the risks and HIs between surface and subsurface soil are averaged, then added to the total risk calculated for groundwater to achieve the overall risk summaries. This may either underestimate or overestimate risk.

5.7.6.3 Uncertainty Associated with Antagonistic or Synergistic Effects

Finally, the risk characterization does not consider antagonistic or synergistic effects. Little or no information is available to determine the potential for antagonism or synergism for the COPCs. Therefore, the uncertainty regarding antagonistic or synergistic effects is ambiguous because potential human health risks may either be underestimated or overestimated.

5.8 SUMMARY OF HUMAN HEALTH RISK ASSESSMENT

This section and Tables 5-15 and 5-16 present a summary of the HHRA findings for Site 21. Four potential receptor groups were evaluated: occupational/maintenance workers, adolescent trespassers, adult and child residents, and construction workers.

5.8.1 Non-Carcinogenic Risks

Pathway-specific RME and CTE HIs were less than or equal to 1.0 for occupational/maintenance workers and adolescent trespassers in the study area. For this reason, adverse non-carcinogenic health effects are not anticipated for these receptors at Site 21.

RME and CTE total HIs (12 and 2, respectively) are greater than 1.0 for the future construction workers in the study area. For future construction workers, the organ-specific HIs for the central nervous system (CNS) associated with inhalation of manganese on particulates/dusts from surface and subsurface soil accounted predominantly for the non-carcinogenic risk for the RME scenario. Cardiovascular system effects were 1.8, attributable to arsenic in soil. In the CTE scenario, the organ-specific HI for the CNS associated with inhalation of manganese on particulates/dusts from surface and subsurface soil accounted for most of the non-carcinogenic risk. Groundwater HIs for the construction worker scenario for both RME and CTE were below 1.0. RAGS Part D Table 9s are included in Appendix G and summarize organ-specific HIs for both RME and CTE.

5.8.1.1 Hypothetical Residential Scenario - No Domestic Use of Groundwater (Groundwater Ordinance in place)

In addition, if the domestic use of groundwater pathways are not included, RME and CTE HIs for future adult residents were less than 1.0. For this reason, with the groundwater ordinance in place, adverse non-carcinogenic health effects are also not anticipated for these receptors.

RME HIs are greater than 1.0 for future child residents in the study area. However, the CTE HIs for the future child resident are less than or equal to 1.0.

For future child residents, ingestion of subsurface and surface soil are the primary pathways of concern in the RME scenario. Arsenic, iron, and cobalt are COPCs in soil with HQs that each exceed 1.0. It should be noted that the future residential scenario with soil conservatively uses the maximum detected concentrations of COPCs as EPCs. RAGS Part D Table 9s are included in Appendix G and summarize organ-specific HIs for both RME and CTE.

Tables 5-15 and 5-16 summarize the hypothetical non-domestic use of groundwater scenario.

5.8.1.2 Hypothetical Residential Scenario with Domestic Use of Groundwater Pathways

Direct exposure to groundwater at Site 21 is not expected to occur under current and/or future land uses. However, the residential groundwater scenario was also evaluated based on the assumption that groundwater at the site, although very unlikely, could be used as a source of domestic drinking water in the future.

Pathway-specific RME and CTE HIs were greater than 1.0 for child and adult residents in the study area under this scenario.

For future child residents, ingestion of subsurface and surface soil and ingestion of groundwater are the primary pathways of concern in the RME scenario. Further examination of these results reveals that the organ-specific HIs for many target organs are greater than 1.0. These include HIs for potential toxic effects to blood, cardiovascular system (CVS), CNS, and the gastrointestinal system, with multiple COPCs contributing to these estimates.

For future adult residents, ingestion of groundwater would be the primary pathway of concern in this RME scenario. COPCs cobalt, iron, and manganese in groundwater, if it were used for drinking water, are associated with target organ-specific HIs that are greater than 1.0. These target organ-specific HIs are for the blood, GI system, and CNS, respectively.

The exceedances of 1.0 by organ-specific HIs and individual contaminants indicate that adverse non-carcinogenic health effects are possible in this scenario, for future child and adult residents, especially in the highly unlikely event that groundwater were used for drinking water.

Tables 5-15 and 5-16 summarize this hypothetical domestic use groundwater scenario.

5.8.2 Carcinogenic Risks

RME and CTE cancer risk estimates for construction workers, adolescent trespassers, and occupational/maintenance workers for Site 21 do not exceed the target USEPA and Illinois TACO Tier 3 cancer risk range (1×10^{-4} to 1×10^{-6}). While RME cancer risk estimates for these receptors exceed the Illinois EPA risk goal (1×10^{-6}) for TACO Tier 1 and 2, the baseline risk assessment provided in this report is consistent with a Tier 3 Evaluation.

5.8.2.1 Hypothetical Residential Scenario - No Domestic Use of Groundwater (Groundwater Ordinance in place)

The total site (excluding the domestic use of groundwater) RME cancer risk estimates for total future residents (adult and child) exceed the target USEPA and Illinois EPA TACO Tier 3 cancer risk range ($1x10^{-4}$ to $1x10^{-6}$) and the Illinois EPA TACO Tier 1 and 2 risk goal ($1x10^{-6}$). The CTE risk estimate is within the target USEPA and Illinois EPA TACO Tier 3 cancer risk range, but exceeds the Illinois EPA TACO Tier 1 and 2 risk goal.

The major contributors to cancer risk at Site 21 under this scenario are primarily arsenic and c-PAHs, and to a lesser degree Aroclor-1260 and dioxins, in surface and subsurface soil.

Tables 5-15 and 5-16 summarize the hypothetical non-domestic use of groundwater scenario.

5.8.2.2 Hypothetical Residential Scenario with Domestic Use of Groundwater Pathways

The total site (soil and groundwater) RME cancer risk estimate for total future residents (adult and child) exceeds the target USEPA and Illinois EPA TACO Tier 3 cancer risk range ($1x10^{-4}$ to $1x10^{-6}$) and the Illinois EPA TACO Tier 1 and 2 risk goal ($1x10^{-6}$). The CTE risk estimate is within the target USEPA cancer risk range, but exceeds the Illinois EPA TACO Tier 1 and 2 risk goal.

The major contributors to cancer risk at Site 21 under this scenario are arsenic and c-PAHs in subsurface and surface soil, and to a lesser degree dioxins and Arochlor-1260 in surface soil; and pentachlorophenol, arsenic, c-PAHs, tetrachloroethylene, dioxins, Aroclor-1260, and delta-BHC in groundwater.

5.8.3 <u>Human Health Risk Assessment Contaminants of Concern</u>

Based on the non-cancer and cancer evaluations, the following contaminants with non-cancer HQs greater than 1.0 or with cancer risks greater than $1x10^{-4}$ were identified as COCs: c-PAHs, arsenic, and iron for residential exposure to surface soil; arsenic, iron, cobalt, and c-PAHs for residential exposure to subsurface soil; and inhalation of manganese in subsurface and surface soil by construction workers.

If the domestic use of groundwater is taken into consideration, based on the non-cancer and cancer evaluations, the following contaminants with non-cancer HQs greater than 1.0 or with cancer risks greater than $1x10^{-4}$ were identified as additional COCs: arsenic, cobalt, iron, manganese, pentachlorophenol, and dioxins for residential exposure to groundwater. However, direct exposure to groundwater at Site 21 is not expected to occur under current and/or future land uses because the facility and the area surrounding the facility are supplied by public water, the facility has a groundwater use restriction in place, and there are no drinking water wells located downgradient of the site.

TABLE 5-1

HUMAN HEALTH SURFACE SOIL SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS No.	Minimum Result	Maximum Result	Average Positive Result	Overall Average	TACO - Residential Soil Inhalation(8)	NON-TACO - Residential Soil Inhalation(9)	TACO - Residential Soil Ingestion(8)	NON-TACO - Residential Soil Ingestion(9)	TACO - Industrial - Commercial Soil Inhalation(8)	NON-TACO - Industrial/ Commercial Soil Inhalation(9)	TACO - Industrial - Commercial Soil Ingestion(8)	NON-TACO - Industrial Commercial Soil Ingestion(10)
Volatile Organics (ug/kg)													
2-BUTANONE (METHYL ETHYL KETONE)	78-93-3	14	14	14	5	NC	NC	NC	NC	NC	NC	NC	NC
ACETONE	67-64-1	21	180 J	76	23	100000000	NC	7000000 N	NC	100000000	NC	NC	NC
BENZENE	71-43-2	0.56 J	1.1 J	1	2	800 C	NC	12000 C	NC	1600 C	NC	100000 C	NC
CARBON DISULFIDE	75-15-0	1.6 J	16	5	4	720000	NC	780000 N	NC	720000	NC	20000000 N	NC
CYCLOHEXANE	110-82-7	0.71 J	2.9 J	1	2	NC	280000	NC	NC	NC	280000	NC	NC
ETHYLBENZENE	100-41-4	0.9 J	0.9 J	1	3	400000	NC	780000 N	NC	400000	NC	20000000 N	NC
METHYL CYCLOHEXANE	108-87-2	0.43 J	3.7 J	2	2	NC	120000	NC	NC	NC	120000	NC	NC
TETRACHLOROETHENE	127-18-4	1.4 J	1.4 J	1	3	11000 C	NC	12000 C	NC	20000 C	NC	110000 C	NC
TOLUENE	108-88-3	1.1 J	1.4 J	1	3	650000	NC	1600000 N	NC	650000	NC	41000000 N	NC
TOTAL XYLENES	1330-20-7	1.6 J	1.6 J	2	3	320000	NC	1600000 N	NC	320000	NC	41000000 N	NC
Semivolatile Organics (ug/kg)													
1,1-BIPHENYL	92-52-4	62 J	62 J	62	183	NC	NC	NC	390000 N	NC	NC	NC	10000000 N
2-METHYLNAPHTHALENE	91-57-6	27	900	416	416	NC	NC	NC	NC	NC	NC	NC	NC
4-METHYLPHENOL	106-44-5	50 J	50 J	50	184	NC	NC	NC	39000 N	NC	NC	NC	1000000 N
ACENAPHTHENE	83-32-9	13	2200	304	236	NC	NC	470000 N	NC	NC	NC	12000000 N	NC
ACENAPHTHYLENE	208-96-8	20	680	125	58	NC	NC	NC	230000 N	NC	NC	NC	6100000 N
ACETOPHENONE	98-86-2	48 J	48 J	48	183	NC	NC	NC	NC	NC	NC	NC	NC
ANTHRACENE	120-12-7	37	7200	918	585	NC	NC	2300000 N	NC	NC	NC	61000000 N	NC
BAP EQUIVALENT-FULLND	NA	9.9373	50631	3566	3566	NC	NC	NC	NC	NC	NC	NC	NC
BENZO(A)ANTHRACENE	56-55-3	110	22000 J	1894	1722	NC	NC	900 C	NC	NC	NC	8000 C	NC
BENZO(A)PYRENE	50-32-8	200	38000 J	3334	2576	NC	NC	90 C	NC	NC	NC	800 C	NC
BENZO(B)FLUORANTHENE	205-99-2	290	59000 J	4383	3984	NC	NC	900 C	NC	NC	NC	8000 C	NC
BENZO(G,H,I)PERYLENE	191-24-2	150	24000 J	1944	1591	NC	NC	NC	230000 N	NC	NC	NC	6100000 N
BENZO(K)FLUORANTHENE	207-08-9	110	21000 J	1736	1578	NC	NC	9000 C	NC	NC	NC	78000 C	NC
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	51 J	3400 J	355	312	31000000	NC	46000 C	NC	31000000	NC	410000 C	NC
BUTYL BENZYL PHTHALATE	85-68-7	97 J	97 J	97	185	930000	NC	1600000 N	NC	930000	NC	41000000 N	NC
CARBAZOLE	86-74-8	66 J	2400	1087	509	NC	NC	32000 C	NC	NC	NC	290000 C	NC
CHRYSENE	218-01-9	130 J	31000 J	2491	2265	NC	NC	88000 C	NC	NC	NC	780000 C	NC
DI-N-BUTYL PHTHALATE	84-74-2	37 J	190 J	114	183	230000 N	NC	780000 N	NC	2300000	NC	20000000 N	NC
DIBENZO(A,H)ANTHRACENE	53-70-3	44	1100	326	179	NC	NC	90 C	NC	NC	NC	800 C	NC
DIBENZOFURAN	132-64-9	39 J	640	222	222	NC	NC	NC	NC	NC	NC	NC	NC
FLUORANTHENE	206-44-0	260	84000	6080	6080	NC	NC	310000 N	NC	NC	NC	8200000 N	NC
FLUORENE	86-73-7	11	1600	462	190	NC	NC	310000 N	NC	NC	NC	8200000 N	NC
INDENO(1,2,3-CD)PYRENE	193-39-5	150	36000 J	3039	2211	NC	NC	900 C	NC	NC	NC	8000 C	NC
NAPHTHALENE*	91-20-3	18	520	237	237	17000 N	NC	160000 N	NC	27000 N	NC	4100000 N	NC
PHENANTHRENE	85-01-8	250	30000	3105	3105	NC	NC	NC	230000 N	NC	NC	NC	6100000 N
PYRENE	129-00-0	240	70000	5049	5049	NC	NC	230000 N	NC	NC	NC	6100000 N	NC
TOTAL PAHS-FULLND	NA	2508	427249	32066	32066	NC	NC	NC	NC	NC	NC	NC	NC
Pesticides/PCBs (ug/kg)													
4,4'-DDD	72-54-8	0.75 J	520 J	101	101	NC	NC	3000 C	NC	NC	NC	24000 C	NC
4,4'-DDE	72-55-9	0.45 J	350 J	56	56	NC	NC	2000 C	NC	NC	NC	17000 C	NC
4,4'-DDT	50-29-3	0.77 J	740 J	81	81	NC	NC	2000 C	NC	1500000 C	NC	17000 C	NC
ALDRIN	309-00-2	0.23 J	0.33 J	0	0	3000 C	NC	40 C	NC	6600 C	NC	300 C	NC
ALPHA-BHC (ALPHA-HEXACHLOROCYCLOHEXANE)	319-84-6	0.28 J	12 J	4	1	800 C	NC	100 C	NC	1500 C	NC	900 C	NC
ALPHA-CHLORDANE	5103-71-9	0.64 J	27 J	6	3	NC	NC	NC	NC	NC	NC	NC	NC
AROCLOR-1260	11096-82-5	21 J	720 J	230	150	NC	NC	NC	NC	NC	NC	NC	NC
BETA-BHC (BETA-HEXACHLOROCYCLOHEXANE)	319-85-7	0.27 J	1 J	1	0	NC	NC	NC	NC	NC	NC	NC	NC
DELTA-BHC (DELTA-HEXACHLOROCYCLOHEXANE)	319-86-8	0.42 J	3.5 J	1	1	NC	NC	NC	NC	NC	NC	NC	NC
DIELDRIN	60-57-1	0.33 J	15 J	5	3	1000 C	NC	40 C	NC	2200 C	NC	400 C	NC
ENDOSULFAN I	959-98-8	0.2 J	14 J	4	1	NC	NC	NC	NC	NC	NC	NC	NC
ENDOSULFAN II	33213-65-9	0.58 J	4.6 J	2	1	NC	NC	NC	NC	NC	NC	NC	NC
ENDOSULFAN SULFATE	1031-07-8	0.96 J	25 J	7	4	NC	NC	NC	NC	NC	NC	NC	NC

TABLE 5-1

HUMAN HEALTH SURFACE SOIL SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	TACO - Construction Worker Soil Ingestion[8]	NON-TACO - Construction Worker Soil Ingestion[10]	TACO - Construction Worker Soil Inhalation[8]	NON-TACO - Construction Worker Soil Inhalation[9]	ORNL Residential Soil Criteria[5]	ORNL Industrial Soil Criteria[5]	USEPA Residential Inhalation SSLs[7]	USEPA Industrial SSLs for Inhalation[7]	USEPA Construction Worker Direct Contact SSLs[6]	USEPA Construction Worker Inhalation SSLs[6]	COPC Flag[17]	Rationale for Contaminant Deletion or Selection
Volatile Organics (ug/kg)												
2-BUTANONE (METHYL ETHYL KETONE)	NC	NC	NC	NC	2800000 N	20000000 N	24000000 sat	24000000 SAT	19000000 N	2000000 N	NO	BSL
ACETONE	NC	NC	100000000	NC	6100000 N	63000000 N	NC	NC	28000000 N	110000 SAT	NO	BSL
BENZENE	2300000 C	NC	2200 C	NC	1100 C	5400 C	830 C	1600 C	390000 C	10000 C	NO	BSL
CARBON DISULFIDE	2000000 N	NC	900 N	NC	82000 N	370000 N	720000 sat	720000 sat	3100000 N	26000 N	NO	BSL
CYCLOHEXANE	NC	NC	NC	11000 N	700000 N	2900000 N	851000000000 N	1320000000000 N	NC	120000 SAT	NO	BSL
ETHYLBENZENE	2000000 N	NC	5800 N	NC	5400 C	27000 C	400000 sat	400000 sat	2000000 C	52000 C	NO	BSL
METHYL CYCLOHEXANE	NC	NC	NC	4600 N	NC	NC	490000 sat	490000 sat	NC	NC	NO	BSL
TETRACHLOROETHENE	2400000 C	NC	28000 C	NC	550 C	2600 C	10000 C	20000 C	40000 C	9100 C	NO	BSL
TOLUENE	41000000 N	NC	4200 N	NC	500000 N	4500000 N	650000 sat	650000 sat	2500000 N	820000 SAT	NO	BSL
TOTAL XYLENES	4100000 N	NC	560 N	NC	63000 N	270000 N	70000 N	110000 N	6200000 N	19000 N	NO	BSL
Semivolatile Organics (ug/kg)												
1,1-BIPHENYL	NC	1000000 N	NC	NC	390000 N	5100000 N	NC	NC	1500000 N	NC	NO	BSL
2-METHYLNAPHTHALENE	NC	NC	NC	NC	31000 N	410000 N	NC	NC	NC	NC	NO	BSL
4-METHYLPHENOL	NC	100000 N	NC	NC	31000 N	310000 N	NC	NC	NC	NC	NO	BSL
ACENAPHTHENE	12000000 N	NC	NC	NC	340000 N	3300000 N	NC	NC	1300000 N	NC	NO	BSL
ACENAPHTHYLENE	NC	6100000 N	NC	NC	340000 N	3300000 N	NC	NC	NC	NC	NO	BSL
ACETOPHENONE	NC	NC	NC	NC	780000 N	10000000 N	NC	NC	3100000 N	NC	NO	BSL
ANTHRACENE	61000000 N	NC	NC	NC	1700000 N	17000000 N	NC	NC	6700000 N	NC	NO	BSL
BAP EQUIVALENT-FULLND	17000 C	NC	NC	NC	15 C	NC	NC	NC	2100 C	230000 C	YES	ASL
BENZO(A)ANTHRACENE	170000 C	NC	NC	NC	150 C	2100 C	NC	NC	21000 C	2300000 C	YES	ASL
BENZO(A)PYRENE	17000 C	NC	NC	NC	15 C	210 C	NC	NC	2100 C	230000 C	YES	ASL
BENZO(B)FLUORANTHENE	170000 C	NC	NC	NC	150 C	2100 C	NC	NC	21000 C	NC	YES	ASL
BENZO(G,H,I)PERYLENE	NC	6100000 N	NC	NC	170000 N	1700000 N	NC	NC	NC	NC	NO	BSL
BENZO(K)FLUORANTHENE	1700000 C	NC	NC	NC	1500 C	21000 C	NC	NC	210000 C	2300000 C	YES	ASL
BIS(2-ETHYLHEXYL)PHTHALATE	410000 N	NC	31000000	NC	35000 C	120000 C	NC	NC	1200000 C	100000000 C	NO	BSL
BUTYL BENZYL PHTHALATE	41000000 N	NC	930000	NC	260000 C	910000 C	NC	NC	8800000 C	NC	NO	BSL
CARBAZOLE	6200000 C	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
CHRYSENE	17000000 C	NC	NC	NC	15000 C	210000 C	NC	NC	2100000 C	23000000 C	YES	ASL
DI-N-BUTYL PHTHALATE	20000000 N	NC	2300000	NC	610000 N	6200000 N	NC	NC	2400000 N	NC	NO	BSL
DIBENZO(A,H)ANTHRACENE	17000 C	NC	NC	NC	15 C	210 C	NC	NC	2100 C	210000 C	YES	ASL
DIBENZOFURAN	NC	82000 N	NC	NC	7800 N	100000 N	NC	NC	31000 N	NC	NO	BSL
FLUORANTHENE	8200000 N	NC	NC	NC	230000 N	2200000 N	NC	NC	890000 N	NC	NO	BSL
FLUORENE	8200000 N	NC	NC	NC	230000 N	2200000 N	NC	NC	890000 N	NC	NO	BSL
INDENO(1,2,3-CD)PYRENE	170000 C	NC	NC	NC	150 C	2100 C	NC	NC	21000 C	2300000 C	YES	ASL
NAPHTHALENE*	410000 N	NC	180	NC	3600 C	18000 C	17000 N	27000 N	450000 N	31000 C	NO	BSL
PHENANTHRENE	NC	6100000 N	NC	NC	170000 N	1700000 N	NC	NC	NC	NC	NO	BSL
PYRENE	6100000 N	NC	NC	NC	170000 N	1700000 N	NC	NC	670000 N	NC	NO	BSL
TOTAL PAHS-FULLND	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
Pesticides/PCBs (ug/kg)												
4,4'-DDD	520000 C	NC	NC	NC	2000 C	7200 C	NC	NC	69000 C	3600000 C	NO	BSL
4,4'-DDE	370000 C	NC	NC	NC	1400 C	5100 C	NC	NC	49000 C	2600000 C	NO	BSL
4,4'-DDT	10000 N	NC	2100000 C	NC	1700 C	7000 C	750000 C	1400000 C	58000 C	2600000 C	NO	BSL
ALDRIN	610 N	NC	9300 C	NC	29 C	100 C	3400 C	6300 C	980 C	51000 C	NO	BSL
ALPHA-BHC (ALPHA-HEXACHLOROCYCLOHEXANE)	20000 C	NC	2100 C	NC	77 C	270 C	750 C	1400 C	2600 C	140000 C	NO	BSL
ALPHA-CHLORDANE	NC	NC	NC	NC	1600 C	6500 C	72000 C	130000 C	55000 C	2500000 C	NO	BSL
AROCLOR-1260	NC	NC	NC	NC	220 C	740 C	NC	NC	7600 C	440000 C	YES	ASL
BETA-BHC (BETA-HEXACHLOROCYCLOHEXANE)	NC	NC	NC	NC	270 C	960 C	6000 C	11000 C	9300 C	470000 C	NO	BSL
DELTA-BHC (DELTA-HEXACHLOROCYCLOHEXANE)	NC	NC	NC	NC	77 C	270 C	NC	NC	NC	NC	NO	BSL
DIELDRIN	7800 C	NC	3100 C	NC	30 C	110 C	1100 C	2100 C	1000 C	54000 C	NO	BSL
ENDOSULFAN I	NC	NC	NC	NC	37000 N	370000 N	NC	NC	NC	NC	NO	BSL
ENDOSULFAN II	NC	NC	NC	NC	37000 N	370000 N	NC	NC	NC	NC	NO	BSL
ENDOSULFAN SULFATE	NC	NC	NC	NC	37000 N	370000 N	NC	NC	NC	NC	NO	BSL

TABLE 5-1

HUMAN HEALTH SURFACE SOIL SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS No.	Minimum Result	Maximum Result	Average Positive Result	Overall Average	TACO - Residential Soil Inhalation(8)	NON-TACO - Residential Soil Inhalation(9)	TACO - Residential Soil Ingestion(8)	NON-TACO - Residential Soil Ingestion(9)	TACO - Industrial - Commercial Soil Inhalation(8)	NON-TACO - Industrial/ Commercial Soil Inhalation(9)	TACO - Industrial - Commercial Soil Ingestion(8)	NON-TACO - Industrial Commercial Soil Ingestion(10)
Pesticides/PCBs (ug/kg)													
ENDRIN	72-20-8	0.71 J	224	39	15	NC	NC	2300 N	NC	NC	NC	61000 N	NC
ENDRIN ALDEHYDE	7421-93-4	0.39 J	28 J	8	2	NC	NC	NC	NC	NC	NC	NC	NC
ENDRIN + ENDRIN ALDEHYDE	NA	1.1 J	252 J	47	17	NC	NC	2300 N	NC	NC	NC	61000 N	NC
ENDRIN KETONE	53494-70-5	0.85 J	44 J	12	3	NC	NC	NC	NC	NC	NC	NC	NC
GAMMA-BHC (LINDANE; GAMMA-HEXACHLOROCYCLOHEXANE)	58-89-9	0.22 J	20	3	1	NC	NC	500 C	NC	NC	NC	4000 C	NC
GAMMA-CHLORDANE	5103-74-2	0.64 J	189 J	20	17	NC	NC	NC	NC	NC	NC	NC	NC
ALPHA + GAMMA CHLORDANE	NA	1.28 J	216 J	25	20	72000 C	NC	1800 C	NC	140000 C	NC	16000 C	NC
HEPTACHLOR EPOXIDE	1024-57-3	0.15 J	3	1	1	5000 C	NC	70 C	NC	9200 C	NC	600 C	NC
METHOXYCHLOR	72-43-5	0.35 J	37 J	8	6	NC	NC	39000 N	NC	NC	NC	1000000 N	NC
Dioxins/Furans (ng/kg)													
1,2,3,4,6,7,8,9-OCDD	3268-87-9	174	1310	742	742	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,4,6,7,8,9-OCDF	39001-02-0	19.8	141	80	80	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,4,6,7,8-HPCDD	35822-46-9	17.7	169	93	93	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,4,6,7,8-HPCDF	67562-39-4	9.64	82.4	46	46	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,4,7,8,9-HPCDF	55673-89-7	0.952 J	4.08 J	3	3	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,4,7,8-HXCDD	39227-28-6	1.9 J	1.9 J	2	2	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,4,7,8-HXCDF	70648-26-9	1.31 J	5.91	4	4	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,6,7,8-HXCDD	57653-85-7	1.14 J	7.9	5	5	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,6,7,8-HXCDF	57117-44-9	1.07 J	11.6	6	6	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,7,8,9-HXCDD	19408-74-3	0.81 J	5.17	3	3	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,7,8,9-HXCDF	72918-21-9	0.358 J	2.68 J	2	2	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,7,8-PECDD	40321-76-4	0.76 J	5.9 J	3	3	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,7,8-PECDF	57117-41-6	1.92 J	1.92 J	2	1	NC	NC	NC	NC	NC	NC	NC	NC
2,3,4,6,7,8-HXCDF	60851-34-5	1.84 J	26.2	14	14	NC	NC	NC	NC	NC	NC	NC	NC
2,3,4,7,8-PECDF	57117-31-4	3.66 J	57.5	31	31	NC	NC	NC	NC	NC	NC	NC	NC
2,3,7,8-TCDD	1746-01-6	0.198 J	0.816 J	1	1	NC	NC	NC	NC	NC	NC	NC	NC
2,3,7,8-TCDF	51207-31-9	3.17	3.17	3	2	NC	NC	NC	NC	NC	NC	NC	NC
TEQ FULLND	NA	3.63652	33.4667	19	19	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL HPCDD	37871-00-4	33.9	326	180	180	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL HPCDF	38998-75-3	25.2	202	114	114	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL HXCDD	34465-46-8	10.6	67	39	39	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL HXCDF	55684-94-1	29.8 J	393 J	211	211	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL PECDD	36088-22-9	4.01 J	19.4 J	12	12	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL PECDF	30402-15-4	40.9	712 J	376	376	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL TCDD	41903-57-5	1.57	10.8	6	6	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL TCDF	55722-27-5	16.2	215 J	116	116	NC	NC	NC	NC	NC	NC	NC	NC
Herbicides (ug/kg)													
2,4-D	94-75-7	217 J	217 J	217	37	NC	NC	78000 N	NC	NC	NC	2000000 N	NC
DICAMBA	1918-00-9	4.86 J	9.99 J	7	4	NC	NC	NC	NC	NC	NC	NC	NC
DINOSEB	88-85-7	17.2 J	17.2 J	17	14	NC	NC	7800 N	NC	NC	NC	200000 N	NC
Inorganics (mg/kg)													
ALUMINUM	7429-90-5	2470	29500	7623	7623	NC	100000 N	NC	**7800 N**	NC	100000 N	NC	100000 N
ANTIMONY	7440-36-0	0.627 J	5.22	2	1	NC	NC	**3.1 N**	NC	NC	NC	82 N	NC
ARSENIC	7440-38-2	3.12	48.4 J	12	12	750 C	NC	NC	NC	1200 C	NC	NC	NC
BARIUM*#	7440-39-3	29.3 J	234 J	76	76	69000 N	NC	550 N	NC	91000 N	NC	14000 N	NC
BERYLLIUM	7440-41-7	0.254	4.71 J	1	1	1300 C	NC	16 N	NC	2100 C	NC	410 N	NC
CADMIUM	7440-43-9	0.132	13	2	2	1800 C	NC	**7.8 N**	NC	2800 C	NC	200 N	NC
CALCIUM	7440-70-2	2240 J	133000	71561	71561	NC	NC	NC	NC	NC	NC	NC	NC
CHROMIUM	7440-47-3	5.38 J	163 J	20	20	270 C	NC	**23 N**	NC	420 C	NC	610 N	NC
COBALT	7440-48-4	2.31	17.7	7	7	NC	NC	470 N	NC	NC	NC	12000 N	NC
COPPER	7440-50-8	12.9	835	94	94	NC	NC	**290 N**	NC	NC	NC	8200 N	NC
IRON	7439-89-6	6660 J	69500 J	26762	26762	NC	NC	NC	**5500 N**	NC	NC	NC	100000 N

HUMAN HEALTH SURFACE SOIL SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	TACO - Construction Worker Soil Ingestion[8]	NON-TACO - Construction Worker Soil Ingestion[10]	TACO - Construction Worker Soil Inhalation[8]	NON-TACO - Construction Worker Soil Inhalation[9]	ORNL Residential Soil Criteria[5]	ORNL Industrial Soil Criteria[5]	USEPA Residential Inhalation SSLs[7]	USEPA Industrial SSLs for Inhalation[7]	USEPA Construction Worker Direct Contact SSLs[6]	USEPA Construction Worker Inhalation SSLs[6]	COPC Flag[17]	Rationale for Contaminant Deletion or Selection
Pesticides/PCBs (ug/kg)												
ENDRIN	6100 N	NC	NC	NC	1800 N	18000 N	NC	NC	7100 N	NC	NO	BSL
ENDRIN ALDEHYDE	NC	NC	NC	NC	1800 N	18000 N	NC	NC	NC	NC	NO	BSL
ENDRIN + ENDRIN ALDEHYDE	6100 N	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
ENDRIN KETONE	NC	NC	NC	NC	1800 N	18000 N	NC	NC	NC	NC	NO	BSL
GAMMA-BHC (LINDANE; GAMMA-HEXACHLOROCYCLOHEXANE)	96000 C	NC	NC	NC	520 C	2100 C	NC	NC	18000 C	NC	NO	BSL
GAMMA-CHLORDANE	NC	NC	NC	NC	1600 C	6500 C	72000 C	130000 C	55000 C	2500000 C	NO	BSL
ALPHA + GAMMA CHLORDANE	100000 C	NC	22000 C	NC	NC	NC	NC	NC	NC	NC	NO	BSL
HEPTACHLOR EPOXIDE	270 N	NC	13000 C	NC	53 C	190 C	4700 C	8800 C	1800 C	96000 C	NO	BSL
METHOXYCHLOR	100000 N	NC	NC	NC	31000 N	310000 N	NC	NC	120000 N	NC	NO	BSL
Dioxins/Furans (ng/kg)												
1,2,3,4,6,7,8,9-OCDD	NC	NC	NC	NC	15000 C	60000 C	NC	NC	NC	NC	NO	BSL
1,2,3,4,6,7,8,9-OCDF	NC	NC	NC	NC	15000 C	60000 C	NC	NC	NC	NC	NO	BSL
1,2,3,4,6,7,8-HPCDD	NC	NC	NC	NC	450 C	1800 C	NC	NC	NC	NC	NO	BSL
1,2,3,4,6,7,8-HPCDF	NC	NC	NC	NC	450 C	1800 C	NC	NC	NC	NC	NO	BSL
1,2,3,4,7,8,9-HPCDF	NC	NC	NC	NC	450 C	1800 C	NC	NC	NC	NC	NO	BSL
1,2,3,4,7,8-HXCDD	NC	NC	NC	NC	45 C	180 C	NC	NC	NC	NC	NO	BSL
1,2,3,4,7,8-HXCDF	NC	NC	NC	NC	45 C	180 C	NC	NC	NC	NC	NO	BSL
1,2,3,6,7,8-HXCDD	NC	NC	NC	NC	45 C	180 C	NC	NC	NC	NC	NO	BSL
1,2,3,6,7,8-HXCDF	NC	NC	NC	NC	45 C	180 C	NC	NC	NC	NC	NO	BSL
1,2,3,7,8,9-HXCDD	NC	NC	NC	NC	94 C	390 C	2540000 C	4750000 C	3200 C	190000 C	NO	BSL
1,2,3,7,8,9-HXCDF	NC	NC	NC	NC	45 C	180 C	NC	NC	NC	NC	NO	BSL
1,2,3,7,8-PECDD	NC	NC	NC	NC	4.5 C	18 C	NC	NC	NC	NC	YES	ASL
1,2,3,7,8-PECDF	NC	NC	NC	NC	150 C	600 C	NC	NC	NC	NC	NO	BSL
2,3,4,6,7,8-HXCDF	NC	NC	NC	NC	45 C	180 C	NC	NC	NC	NC	NO	BSL
2,3,4,7,8-PECDF	NC	NC	NC	NC	15 C	60 C	NC	NC	NC	NC	YES	ASL
2,3,7,8-TCDD	NC	NC	NC	NC	4.5 C	18 C	42 C	79 C	150 C	6500 C	NO	BSL
2,3,7,8-TCDF	NC	NC	NC	NC	45 C	180 C	NC	NC	NC	NC	NO	BSL
TEQ FULLND	NC	NC	NC	NC	4.5 C	NC	NC	NC	NC	NC	YES	ASL
TOTAL HPCDD	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
TOTAL HPCDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
TOTAL HXCDD	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
TOTAL HXCDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
TOTAL PECDD	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
TOTAL PECDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
TOTAL TCDD	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
TOTAL TCDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
Herbicides (ug/kg)												
2,4-D	200000 N	NC	NC	NC	69000 N	770000 N	NC	NC	270000 N	NC	NO	BSL
DICAMBA	NC	NC	NC	NC	180000 N	1800000 N	NC	NC	710000 N	NC	NO	BSL
DINOSEB	20000 N	NC	NC	NC	6100 N	62000 N	NC	NC	24000 N	NC	NO	BSL
Inorganics (mg/kg)												
ALUMINUM	NC	41000 N	NC	87000 N	7700 N	99000 N	709000 N	1100000 N	31000 N	1800 N	YES	ASL
ANTIMONY	8.2 N	NC	NC	NC	3.1 N	41 N	NC	NC	12 N	NC	YES	ASL
ARSENIC	61 N	NC	25000 C	NC	0.39 C	1.6 C	769 C	1440 C	13 C	5.3 N	YES	ASL
BARIUM[*#]	1400 N	NC	87000 N	NC	1500 N	19000 N	70900 N	110000 N	6200 N	180 N	YES	ASL
BERYLLIUM	41 N	NC	44000 C	NC	16 N	200 N	1380 C	2570 C	62 N	7.1 N	NO	BSL
CADMIUM	20 N	NC	59000 C	NC	7 N	80 N	1840 C	3430 C	28 N	3.6 N	YES	ASL
CALCIUM	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
CHROMIUM	410 N	NC	69	NC	NC	NC	276 C	515 C	NC	NC	YES	ASL
COBALT	1200 N	NC	NC	NC	2.3 N	30 N	1180 C	2210 C	9.3 N	2.1 N	YES	ASL
COPPER	820 N	NC	NC	NC	310 N	4100 N	NC	NC	1200 N	NC	YES	ASL
IRON	NC	14000 N	NC	NC	5500 N	72000 N	NC	NC	22000 N	NC	YES	ASL

TABLE 5-1

HUMAN HEALTH SURFACE SOIL SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS No.	Minimum Result	Maximum Result	Average Positive Result	Overall Average	TACO - Residential Soil Inhalation[8]	NON-TACO - Residential Soil Inhalation[9]	TACO - Residential Soil Ingestion[8]	NON-TACO - Residential Soil Ingestion[9]	TACO - Industrial - Commercial Soil Inhalation[8]	NON-TACO - Industrial/ Commercial Soil Inhalation[9]	TACO - Industrial - Commercial Soil Ingestion[8]	NON-TACO - Industrial Commercial Soil Ingestion[10]
Inorganics (mg/kg)													
LEAD+	7439-92-1	16.7	428	101	101	NC	NC	400	NC	NC	NC	800	NC
MAGNESIUM	7439-95-4	1440	75800	34817	34817	NC	NC	325000	NC	NC	NC	NC	NC
MANGANESE	7439-96-5	173	2420 J	589	589	6900 N	NC	160 N	NC	9100 N	NC	4100 N	NC
MERCURY	7439-97-6	0.0332	8.98	1	1	1 N	NC	2.3 N	NC	1.6 N	NC	61 N	NC
NICKEL	7440-02-0	5.56	56.2 J	22	22	13000 C	NC	160 N	NC	21000 C	NC	4100 N	NC
POTASSIUM	7440-09-7	428	1930	839	839	NC	NC	NC	NC	NC	NC	NC	NC
SILVER	7440-22-4	0.233	1.41	1	0	NC	NC	39 N	NC	NC	NC	1000 N	NC
SODIUM	7440-23-5	230	2080	927	927	NC	NC	NC	NC	NC	NC	NC	NC
VANADIUM	7440-62-2	8.94	25.7	17	17	NC	NC	55 N	NC	NC	NC	1400 N	NC
ZINC	7440-66-6	46.5	1230	247	247	NC	NC	2300 N	NC	NC	NC	61000 N	NC

TABLE 5-1

HUMAN HEALTH SURFACE SOIL SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	TACO - Construction Worker Soil Ingestion(8)	NON-TACO - Construction Worker Soil Ingestion(10)	TACO - Construction Worker Soil Inhalation(8)	NON-TACO - Construction Worker Soil Inhalation(9)	ORNL Residential Soil Criteria(5)	ORNL Industrial Soil Criteria(5)	USEPA Residential Inhalation SSLs(7)	USEPA Industrial SSLs for Inhalation(7)	USEPA Construction Worker Direct Contact SSLs(6)	USEPA Construction Worker Inhalation SSLs(6)	COPC Flag(17)	Rationale for Contaminant Deletion or Selection
Inorganics (mg/kg)												
LEAD+	700	NC	NC	NC	400	800	NC	NC	NC	NC	NO	BSL+
MAGNESIUM	730000	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
MANGANESE	410 N	NC	870	NC	180 N	2300 N	7090 N	11000 N	4300 N	18 N	YES	ASL
MERCURY	6.1 N	NC	0.01	NC	0.56 N	3.4 N	2.9 sat	2.9 sat	5 N	110 N	YES	ASL
NICKEL	410 N	NC	440000 C	NC	150 N	2000 N	NC	NC	620 N	320 N	NO	BSL
POTASSIUM	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
SILVER	100 N	NC	NC	NC	39 N	510 N	NC	NC	150 N	NC	NO	BSL
SODIUM	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
VANADIUM	140 N	NC	NC	NC	39 N	520 N	NC	NC	2.2 N	36 N	YES	ASL
ZINC	6100 N	NC	NC	NC	2300 N	31000 N	NC	NC	9300 N	NC	NO	BSL

Associated Samples:
NTC21SB01-SO-0102
NTC21SB02-SO-0001
NTC21SB03-SO-0001
NTC21SB04-SO-0001
NTC21SB05-SO-0001
NTC21SB06-SO-0001
NTC21SB07-SO-0001
NTC21SB08-SO-0001
NTC21SB09-SO-0001
NTC21SB10-SO-0001
NTC21SB11-SO-0001
NTC21SB12-SO-0001
NTC21SB13-SO-0001
NTC21SB14-SO-0001
NTC21SB15-SO-0001
NTC21SB16-SO-0001
NTC21SB17-SO-0001
NTC21SB18-SO-0001
NTC21SB19-SO-0001
NTC21SB20-SO-0001
NTC21SB21-SO-0001
NTC21SB22-SO-0001

Footnotes:
1 - Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 - The maximum detected concentration is used for screening purposes
3 - Illinois EPA Remediation Objectives for Class 1 Groundwater (online 2010).
4 - Background data used - Illinois EPA background concentration (Illinois EPA, Appendix A, Table G of TACO)
5 - USEPA ORNL Screening Level. The noncarcinogenic values (denoted with a "N" flag) are the ORNL value divided by 10 to correspond to a target hazard quotientof 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag) (USEPA Region IX, October 2004, Updated December 28, 2004).
6 - Soil Screening Levels for Migration from Soil to Air for Construction Worker Scenario were calculated by Tetra Tech, NUS using methodology and equations presented in the Supplemental Guidance For Developing Soil Screening Levels for Superfund Sites, OSWER 93355.4-24, December 2002.
7 - SSLs for the migration of chemicals from soil to groundwater and soil to air were calculated by Tetra Tech, NUS using the methodology and equations presented in the Supplemental Guidance For Developing Soil Screening Levels for Superfund Sites, OSWER 93355.4-24, December 2002 and online at http://rais.ornl.gov/epa/ssl1.shtml since these values are more recent than those published in the 1996 and 2002 SSL guidance documents.
8 - Section 742 Table A, Tier 1, Soil Remediation Objectives - Residential/Industrial/Commercial (Ingestion or Inhalation)(Online, 2010)
9 - Soil Remediation Objectives for Residential/Industrial/Commercial roperties, Non-TACO Chemicals (2010)
10 - Ten percent of the noncarcinogenic value is less than the carcinogenic value, therefore the noncarcinogenic value is presented.
11 - Values are for hexavalent chromium.
12 - Acenaphthene is used as a surrogate for acenaphthylene
13 - Pyrene is used as a surrogate for benzo(ghi)perylene and phenanthrene
14 - Nickle criteria based on nickle soluble salts
15 - TACO table footnote indicates that elemental Hg " Inhalation remediation objective only applies at sites where elemental mercury is a contaminant of concern."
16 - COPC flag for construction worker inhalation scenario only
17 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
BAP equivalent criteria based on BaP
Chlordane used as a surrogate for alpha + gamma chlordane
Endrin used as a surrogate for endrin + endrin aldehyde
Endosulfan used as a surrogate for endosulfan I
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.
+ The lead maximum soil concentration is only slightly above the residential screening value (428 mg/kg vs. 400 mg/kg), however the mean lead concentration (which USEPA recommends utilizing for risk evaluations) is way below the residential screening value (101 mg/kg). Therefore, lead is not retained as a COPC and will be discussed qualitatively, as the IEUBK and ALM risk evaluations would be well below acceptable results with such a low lead mean concentration.
*Inhalation pathway only
#Construction worker scenario only

Definitions:
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Non-carcinogen
NC = No criteria

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level

For Elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient

TABLE 5-2

HUMAN HEALTH SUBSURFACE SOIL SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS No.	Minimum Result	Maximum Result	Average Positive Result	Overall Average	TACO - Residential Soil Inhalation(8)	NON-TACO - Residential Soil Inhalation(9)	TACO - Residential Soil Ingestion(8)	NON-TACO - Residential Soil Ingestion(9)	TACO - Industrial - Commercial Soil Inhalation(8)	NON-TACO - Industrial/ Commercial Soil Inhalation(9)	TACO - Industrial - Commercial Soil Ingestion(8)	NON-TACO - Industrial Commercial Soil Ingestion(10)
Volatile Organics (ug/kg)													
2-BUTANONE (METHYL ETHYL KETONE)	78-93-3	9 J	28 J	14.2	5.2	NC	NC	NC	NC	NC	NC	NC	NC
ACETONE	67-64-1	25 J	87	56.8	15.0	100000000	NC	7000000 N	NC	100000000	NC	NC	NC
BENZENE	71-43-2	0.41 J	4.8	1.8	2.3	800 C	NC	12000 C	NC	1600 C	NC	100000 C	NC
CARBON DISULFIDE	75-15-0	1.2 J	12	4.5	3.7	720000	NC	780000 N	NC	720000	NC	20000000 N	NC
CHLOROMETHANE	74-87-3	1 J	2.2 J	1.6	4.8	NC	11000 N	NC	NC	NC	18000 N	NC	NC
CIS-1,2-DICHLOROETHENE	156-59-2	1.5 J	1.5 J	1.5	4.9	1200000	NC	78000 N	NC	1200000	NC	2000000 N	NC
CYCLOHEXANE	110-82-7	0.62 J	9	2.4	2.4	NC	280000	NC	NC	NC	280000	NC	NC
ETHYLBENZENE	100-41-4	0.7 J	1.9 J	1.2	2.3	400000	NC	780000 N	NC	400000	NC	20000000 N	NC
ISOPROPYLBENZENE (CUMENE)	98-82-8	0.97 J	0.97 J	1.0	2.5	NC	NC	NC	NC	NC	NC	NC	NC
METHYLCYCLOHEXANE	108-87-2	1.2 J	11	3.9	3.7	NC	120000	NC	NC	NC	120000	NC	NC
TETRACHLOROETHENE	127-18-4	3.3 J	18	10.7	3.4	11000 C	NC	12000 C	NC	20000 C	NC	110000 C	NC
TOLUENE	108-88-3	1.4 J	5.6	3.0	2.9	650000	NC	1600000 N	NC	650000	NC	41000000 N	NC
TOTAL XYLENES	1330-20-7	2.2 J	2.2 J	2.2	2.6	320000	NC	1600000 N	NC	320000	NC	41000000 N	NC
TRICHLOROFLUOROMETHANE	75-69-4	1.4 J	2.8 J	2.3	2.6	NC	NC	NC	NC	NC	NC	NC	NC
Semivolatile Organics (ug/kg)													
1,1-BIPHENYL	92-52-4	96 J	96 J	96.0	192.2	NC	NC	NC	390000 N	NC	NC	NC	10000000 N
2-METHYLNAPHTHALENE	91-57-6	2.4 J	2100	348.5	254.1	NC	NC	NC	NC	NC	NC	NC	NC
ACENAPHTHENE	83-32-9	12	880	165.8	91.4	NC	NC	470000 N	NC	NC	NC	12000000 N	NC
ACENAPHTHYLENE	208-96-8	2.8 J	2000	223.0	112.5	NC	NC	NC	230000 N	NC	NC	NC	6100000 N
ACETOPHENONE	98-86-2	230 J	230 J	230.0	198.8	NC	NC	NC	NC	NC	NC	NC	NC
ANTHRACENE	120-12-7	2.9 J	5000	697.5	349.8	NC	NC	2300000 N	NC	NC	NC	61000000 N	NC
BAP EQUIVALENT-FULLND	NA	8.4353	39374	2316.8	2316.8	NC	NC	NC	NC	NC	NC	NC	NC
BENZALDEHYDE	100-52-7	220 J	220 J	220.0	185.5	NC	620000	NC	780000 N	NC	620000	NC	20000000 N
BENZO(A)ANTHRACENE	56-55-3	2.5 J	32000	2140.3	1848.7	NC	NC	**900 C**	NC	NC	NC	**8000 C**	NC
BENZO(A)PYRENE	50-32-8	12	27000	2701.9	1597.5	NC	NC	**90 C**	NC	NC	NC	**800 C**	NC
BENZO(B)FLUORANTHENE	205-99-2	6.4	41000	3090.4	2388.5	NC	NC	**900 C**	NC	NC	NC	**8000 C**	NC
BENZO(G,H,I)PERYLENE	191-24-2	4.1	11000	973.0	708.2	NC	NC	NC	230000 N	NC	NC	NC	6100000 N
BENZO(K)FLUORANTHENE	207-08-9	7.2	14000	1135.9	878.2	NC	NC	**9000 C**	NC	NC	NC	78000 C	NC
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	54 J	280 J	170.4	196.3	31000000	NC	46000 C	NC	31000000	NC	410000 C	NC
BUTYL BENZYL PHTHALATE	85-68-7	110 J	110 J	110.0	200.9	930000	NC	1600000 N	NC	930000	NC	41000000 N	NC
CARBAZOLE	86-74-8	430 J	1000	715.0	439.8	NC	NC	32000 C	NC	NC	NC	290000 C	NC
CHRYSENE	218-01-9	3.4 J	34000	2091.1	1996.1	NC	NC	88000 C	NC	NC	NC	780000 C	NC
DIBENZO(A,H)ANTHRACENE	53-70-3	2.4 J	3300	440.9	181.6	NC	NC	**90 C**	NC	NC	NC	**800 C**	NC
DIBENZOFURAN	132-64-9	34 J	670	209.6	208.9	NC	NC	NC	NC	NC	NC	NC	NC
FLUORANTHENE	206-44-0	6.8	56000	4247.6	3668.6	NC	NC	310000 N	NC	NC	NC	8200000 N	NC
FLUORENE	86-73-7	2.5 J	1200	253.9	72.7	NC	NC	310000 N	NC	NC	NC	8200000 N	NC
INDENO(1,2,3-CD)PYRENE	193-39-5	12	16000	1706.9	1009.5	NC	NC	**900 C**	NC	NC	NC	**8000 C**	NC
NAPHTHALENE	91-20-3	3.8 J	4600	593.8	432.4	17000 N	NC	160000 N	NC	27000 N	NC	4100000 N	NC
PHENANTHRENE	85-01-8	1.8 J	11000	1498.3	1430.3	NC	NC	NC	230000 N	NC	NC	NC	6100000 N
PYRENE	129-00-0	6.9	52000	3730.6	3222.2	NC	NC	230000 N	NC	NC	NC	6100000 N	NC
TOTAL PAHS-FULLND	NA	61.1	308070	20255.1	20255.1	NC	NC	NC	NC	NC	NC	NC	NC
Pesticides/PCBs (ug/kg)													
4,4'-DDD	72-54-8	0.37 J	480	120.2	49.4	NC	NC	3000 C	NC	NC	NC	24000 C	NC
4,4'-DDE	72-55-9	0.69 J	300	57.0	26.1	NC	NC	2000 C	NC	NC	NC	17000 C	NC
4,4'-DDT	50-29-3	1.2 J	240 J	40.1	18.4	NC	NC	2000 C	NC	1500000 C	NC	17000 C	NC
ALDRIN	309-00-2	0.83 J	0.83 J	0.8	0.2	3000 C	NC	40 C	NC	6600 C	NC	300 C	NC
ALPHA-BHC (ALPHA-HEXACHLOROCYCLOHEXANE)	319-84-6	0.27 J	2.8 J	0.9	0.4	800 C	NC	100 C	NC	1500 C	NC	900 C	NC
ALPHA-CHLORDANE	5103-71-9	0.41 J	26 J	8.1	2.7	NC	NC	NC	NC	NC	NC	NC	NC
AROCLOR-1242	53469-21-9	47 J	47 J	47.0	12.1	NC	NC	NC	NC	NC	NC	NC	NC
AROCLOR-1260	11096-82-5	29 J	440 J	156.5	63.7	NC	NC	NC	NC	NC	NC	NC	NC
BETA-BHC (BETA-HEXACHLOROCYCLOHEXANE)	319-85-7	0.57 J	1.1 J	0.8	0.3	NC	NC	NC	NC	NC	NC	NC	NC
DELTA-BHC (DELTA-HEXACHLOROCYCLOHEXANE)	319-86-8	0.25 J	3	1.1	0.4	NC	NC	NC	NC	NC	NC	NC	NC
DIELDRIN	60-57-1	0.87 J	5.6 J	2.3	1.1	1000 C	NC	40 C	NC	2200 C	NC	400 C	NC
ENDOSULFAN I	959-98-8	0.29 J	3.22 J	1.4	0.4	NC	NC	NC	NC	NC	NC	NC	NC
ENDOSULFAN II	33213-65-9	0.19 J	1.26	0.8	0.5	NC	NC	NC	NC	NC	NC	NC	NC

TABLE 5-2

HUMAN HEALTH SUBSURFACE SOIL SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	TACO - Construction Worker Soil Ingestion[8]	NON-TACO - Construction Worker Soil Ingestion[10]	TACO - Construction Worker Soil Inhalation[9]	NON-TACO - Construction Worker Soil Inhalation[8]	ORNL Residential Soil Criteria[5]	ORNL Industrial Soil Criteria[5]	USEPA Residential Inhalation SSLs[7]	USEPA Industrial SSLs for Inhalation[7]	USEPA Construction Worker Direct Contact SSLs[6]	USEPA Construction Worker Inhalation SSLs[6]	COPC Flag[17]	Rationale for Contaminant Deletion or Selection
Volatile Organics (ug/kg)												
2-BUTANONE (METHYL ETHYL KETONE)	NC	NC	NC	NC	2800000 N	20000000 N	24000000 sat	24000000 SAT	19000000 N	2000000 N	NO	BSL
ACETONE	NC	NC	100000000	NC	6100000 N	63000000 N	NC	NC	28000000 N	110000000 SAT	NO	BSL
BENZENE	2300000 C	NC	2200 C	NC	1100 C	5400 C	830 C	1600 C	390000 C	10000 C	NO	BSL
CARBON DISULFIDE	2000000 N	NC	900 N	NC	82000 N	370000 N	720000 sat	720000 sat	3100000 N	26000 N	NO	BSL
CHLOROMETHANE	NC	NC	NC	1100 N	12000 N	50000 N	2100 C	3900 C	NC	3500 N	NO	BSL
CIS-1,2-DICHLOROETHENE	2000000 N	NC	1200000	NC	78000 N	1000000 N	NC	NC	310000 N	NC	NO	BSL
CYCLOHEXANE	NC	NC	NC	11000 N	700000 N	2900000 N	851000000000 N	1320000000000 N	NC	120000 SAT	NO	BSL
ETHYLBENZENE	2000000 N	NC	5800 N	NC	5400 C	27000 C	400000 sat	400000 sat	2000000 C	52000 C	NO	BSL
ISOPROPYLBENZENE (CUMENE)	NC	NC	NC	NC	210000 N	1100000 N	850000 sat	850000 sat	3100000 N	270000 SAT	NO	BSL
METHYLCYCLOHEXANE	NC	NC	NC	4600 N	NC	NC	490000 sat	490000 sat	NC	NC	NO	BSL
TETRACHLOROETHENE	2400000 C	NC	28000 C	NC	550 C	2600 C	10000 C	20000 C	40000 C	9100 C	NO	BSL
TOLUENE	41000000 N	NC	4200 N	NC	500000 N	4500000 N	650000 sat	650000 sat	2500000 N	820000 SAT	NO	BSL
TOTAL XYLENES	4100000 N	NC	560 N	NC	63000 N	270000 N	70000 N	110000 N	6200000 N	19000 N	NO	BSL
TRICHLOROFLUOROMETHANE	NC	NC	NC	NC	79000 N	340000 N	110000 N	160000 N	9300000 N	24000 N	NO	BSL
Semivolatile Organics (ug/kg)												
1,1-BIPHENYL	NC	1000000 N	NC	NC	390000 N	5100000 N	NC	NC	1500000 N	NC	NO	BSL
2-METHYLNAPHTHALENE	NC	NC	NC	NC	31000 N	410000 N	NC	NC	NC	NC	NO	BSL
ACENAPHTHENE	12000000 N	NC	NC	NC	340000 N	3300000 N	NC	NC	1300000 N	NC	NO	BSL
ACENAPHTHYLENE	NC	6100000 N	NC	NC	340000 N	3300000 N	NC	NC	NC	NC	NO	BSL
ACETOPHENONE	NC	NC	NC	NC	780000 N	10000000 N	NC	NC	3100000 N	NC	NO	BSL
ANTHRACENE	61000000 N	NC	NC	NC	1700000 N	17000000 N	NC	NC	6700000 N	NC	NO	BSL
BAP EQUIVALENT-FULLND	17000 C	NC	NC	NC	15 C	210 C	NC	NC	2100 C	230000 C	YES	ASL
BENZALDEHYDE	NC	20000000 N	NC	620000	780000 N	10000000 N	NC	NC	3100000 N	NC	NO	BSL
BENZO(A)ANTHRACENE	170000 C	NC	NC	NC	150 C	2100 C	NC	NC	21000 C	2300000 C	YES	ASL
BENZO(A)PYRENE	17000 C	NC	NC	NC	15 C	210 C	NC	NC	2100 C	230000 C	YES	ASL
BENZO(B)FLUORANTHENE	170000 C	NC	NC	NC	150 C	2100 C	NC	NC	21000 C	NC	YES	ASL
BENZO(G,H,I)PERYLENE	NC	6100000 N	NC	NC	170000 N	1700000 N	NC	NC	NC	NC	NO	BSL
BENZO(K)FLUORANTHENE	1700000 C	NC	NC	NC	1500 C	21000 C	NC	NC	210000 C	2300000 C	NO	BSL
BIS(2-ETHYLHEXYL)PHTHALATE	410000 N	NC	31000000	NC	35000 C	120000 C	NC	NC	1200000 C	100000000 C	NO	BSL
BUTYL BENZYL PHTHALATE	41000000 N	NC	930000	NC	260000 C	910000 C	NC	NC	8800000 C	NC	NO	BSL
CARBAZOLE	6200000 C	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
CHRYSENE	17000000 C	NC	NC	NC	15000 C	210000 C	NC	NC	2100000 C	23000000 C	YES	ASL
DIBENZO(A,H)ANTHRACENE	17000 C	NC	NC	NC	15 C	210 C	NC	NC	2100 C	210000 C	YES	ASL
DIBENZOFURAN	NC	82000 N	NC	NC	7800 N	100000 N	NC	NC	31000 N	NC	NO	BSL
FLUORANTHENE	8200000 N	NC	NC	NC	230000 N	2200000 N	NC	NC	890000 N	NC	NO	BSL
FLUORENE	8200000 N	NC	NC	NC	230000 N	2200000 N	NC	NC	890000 N	NC	NO	BSL
INDENO(1,2,3-CD)PYRENE	170000 C	NC	NC	NC	150 C	2100 C	NC	NC	21000 C	2300000 C	NO	BSL
NAPHTHALENE	410000 N	NC	180 N	NC	3600 C	18000 C	17000 N	27000 N	450000 N	31000 C	NO	BSL
PHENANTHRENE	NC	6100000 N	NC	NC	170000 N	1700000 N	NC	NC	NC	NC	NO	BSL
PYRENE	6100000 N	NC	NC	NC	170000 N	1700000 N	NC	NC	670000 N	NC	NO	BSL
TOTAL PAHS-FULLND	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
Pesticides/PCBs (ug/kg)												
4,4'-DDD	520000 C	NC	NC	NC	2000 C	7200 C	NC	NC	69000 C	3600000 C	NO	BSL
4,4'-DDE	370000 C	NC	NC	NC	1400 C	5100 C	NC	NC	49000 C	2600000 C	NO	BSL
4,4'-DDT	10000 N	NC	2100000 C	NC	1700 C	7000 C	750000 C	1400000 C	58000 C	2600000 C	NO	BSL
ALDRIN	610 N	NC	9300 C	NC	29 C	100 C	3400 C	6300 C	980 C	51000 C	NO	BSL
ALPHA-BHC (ALPHA-HEXACHLOROCYCLOHEXANE)	20000 C	NC	2100 C	NC	77 C	270 C	750 C	1400 C	2600 C	140000 C	NO	BSL
ALPHA-CHLORDANE	NC	NC	NC	NC	1600 C	6500 C	72000 C	130000 C	55000 C	2500000 C	NO	BSL
AROCLOR-1242	NC	NC	NC	NC	220 C	740 C	NC	NC	7600 C	440000 C	NO	BSL
AROCLOR-1260	NC	NC	NC	NC	220 C	740 C	NC	NC	7600 C	440000 C	YES	ASL
BETA-BHC (BETA-HEXACHLOROCYCLOHEXANE)	NC	NC	NC	NC	270 C	960 C	6000 C	11000 C	9300 C	470000 C	NO	BSL
DELTA-BHC (DELTA-HEXACHLOROCYCLOHEXANE)	NC	NC	NC	NC	77 C	270 C	NC	NC	NC	NC	NO	BSL
DIELDRIN	7800 C	NC	3100 C	NC	30 C	110 C	1100 C	2100 C	1000 C	54000 C	NO	BSL
NDOSULFAN I	NC	NC	NC	NC	37000 N	370000 N	NC	NC	140000 N	NC	NO	BSL
NDOSULFAN II	NC	NC	NC	NC	37000 N	370000 N	NC	NC	140000 N	NC	NO	BSL

TABLE 5-2

HUMAN HEALTH SUBSURFACE SOIL SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS No.	Minimum Result	Maximum Result	Average Positive Result	Overall Average	TACO - Residential Soil Inhalation(8)	NON-TACO - Residential Soil Inhalation(9)	TACO - Residential Soil Ingestion(8)	NON-TACO - Residential Soil Ingestion(9)	TACO - Industrial - Commercial Soil Inhalation(8)	NON-TACO - Industrial/ Commercial Soil Inhalation(9)	TACO - Industrial - Commercial Soil Ingestion(8)	NON-TACO - Industrial Commercial Soil Ingestion(10)
Pesticides/PCBs (ug/kg)													
ENDOSULFAN SULFATE	1031-07-8	0.65 J	8.7 J	3.1	1.4	NC	NC	NC	NC	NC	NC	NC	NC
ENDRIN	72-20-8	0.82 J	3.2 J	1.7	0.7	NC	NC	2300 N	NC	NC	NC	61000 N	NC
ENDRIN ALDEHYDE	7421-93-4	1.1 J	4.9 J	3.0	0.6	NC	NC	NC	NC	NC	NC	NC	NC
ENDRIN + ENDRIN ALDEHYDE	NA	1.92 J	8.1 J	4.7	1.4	NC	NC	2300 N	NC	NC	NC	61000 N	NC
ENDRIN KETONE	53494-70-5	1.5 J	1.5 J	1.5	0.5	NC	NC	NC	NC	NC	NC	NC	NC
GAMMA-BHC (LINDANE; GAMMA-HEXACHLOROCYCLOHEXANE)	58-89-9	0.33 J	2.3 J	0.9	0.3	NC	NC	500 C	NC	NC	NC	4000 C	NC
GAMMA-CHLORDANE	5103-74-2	0.15 J	46 J	7.3	4.1	NC	NC	NC	NC	NC	NC	NC	NC
HEPTACHLOR EPOXIDE	1024-57-3	0.26 J	6.9 J	2.4	0.9	5000 C	NC	70 C	NC	9200 C	NC	600 C	NC
METHOXYCHLOR	72-43-5	0.8 J	34.2 J	7.0	3.3	NC	NC	39000 N	NC	NC	NC	1000000 N	NC
ALPHA + GAMMA CHLORDANE	NA	0.56 J	72 J	15.4	6.8	72000 C	NC	1800 C	NC	140000 C	NC	16000 C	NC
Dioxins/Furans (ng/kg)													
1,2,3,4,6,7,8,9-OCDD	3268-87-9	1950	1950	1950.0	1950.0	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,4,6,7,8,9-OCDF	39001-02-0	44.8	44.8	44.8	44.8	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,4,6,7,8-HPCDD	35822-46-9	167	167	167.0	167.0	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,4,6,7,8-HPCDF	67562-39-4	18.1	18.1	18.1	18.1	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,4,7,8,9-HPCDF	55673-89-7	1.7 J	1.7 J	1:7	1.7	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,4,7,8-HXCDD	39227-28-6	1.0 J	1.0 J	1.0	1.0	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,4,7,8-HXCDF	70648-26-9	2.6 J	2.6 J	2.6	2.6	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,6,7,8-HXCDD	57653-85-7	3.6 J	3.6 J	3.6	3.6	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,6,7,8-HXCDF	57117-44-9	1.4 J	1.4 J	1.4	1.4	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,7,8,9-HXCDD	19408-74-3	2.4 J	2.4 J	2.4	2.4	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,7,8,9-HXCDF	72918-21-9	0.7 J	0.7 J	0.7	0.7	NC	NC	NC	NC	NC	NC	NC	NC
1,2,3,7,8-PECDD	40321-76-4	0.6 J	0.6 J	0.6	0.6	NC	NC	NC	NC	NC	NC	NC	NC
2,3,4,6,7,8-HXCDF	60851-34-5	2.1 J	2.1 J	2.1	2.1	NC	NC	NC	NC	NC	NC	NC	NC
2,3,4,7,8-PECDF	57117-31-4	2.8 J	2.8 J	2.8	2.8	NC	NC	NC	NC	NC	NC	NC	NC
2,3,7,8-TCDD	1746-01-6	0.3 J	0.3 J	0.3	0.3	NC	NC	NC	NC	NC	NC	NC	NC
TEQ FULLND	NA	5.6	5.6	5.6	5.6	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL HPCDD	37871-00-4	335	335	335.0	335.0	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL HPCDF	38998-75-3	61.3	61.3	61.3	61.3	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL HXCDD	34465-46-8	29.8	29.8	29.8	29.8	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL HXCDF	55684-94-1	40.4	40.4	40.4	40.4	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL PECDD	36088-22-9	4.8 J	4.8 J	4.8	4.8	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL PECDF	30402-15-4	32.5	32.5	32.5	32.5	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL TCDD	41903-57-5	2.9	2.9	2.9	2.9	NC	NC	NC	NC	NC	NC	NC	NC
TOTAL TCDF	55722-27-5	12.6	12.6	12.6	12.6	NC	NC	NC	NC	NC	NC	NC	NC
Herbicides (ug/kg)													
2,4-D (Dichlorophenoxy Acetic Acid, 2,4-)	94-75-7	54.6 J	54.6 J	54.6	31.0	NC	NC	78000 N	NC	NC	NC	2000000 N	NC
DICAMBA	1918-00-9	6.13 J	29.2 J	11.5	4.9	NC	NC	NC	NC	NC	NC	NC	NC
Inorganics (mg/kg)													
ALUMINUM	7429-90-5	3720	24300	9343.2	9343.2	NC	100000 N	NC	**7800 N**	NC	100000 N	NC	100000 N
ANTIMONY	7440-36-0	0.6	0.6	0.6	0.4	NC	NC	3.1 N	NC	NC	NC	82 N	NC
ARSENIC	7440-38-2	4.2	85 J	12.1	12.1	750 C	NC	NC	NC	1200 C	NC	NC	NC
BARIUM	7440-39-3	12.4 J	157 J	69.3	69.3	69000 N	NC	550 N	NC	91000 N	NC	14000 N	NC
BERYLLIUM	7440-41-7	0.2	4.1	1.0	1.0	1300 C	NC	16 N	NC	2100 C	NC	410 N	NC
CADMIUM	7440-43-9	0.1	9.6	1.3	1.2	1800 C	NC	**7.8 N**	NC	2800 C	NC	200 N	NC
CALCIUM	7440-70-2	4280 J	177000	54851.8	54851.8	NC	NC	NC	NC	NC	NC	NC	NC
CHROMIUM	7440-47-3	7.9	34.3 J	15.1	15.1	270 C	NC	**23 N**	NC	420 C	NC	610 N	NC
COBALT	7440-48-4	2.3	23.8	8.9	8.9	NC	NC	470 N	NC	NC	NC	12000 N	NC
COPPER	7440-50-8	9.9	124 J	47.6	47.6	NC	NC	290 N	NC	NC	NC	8200 N	NC
IRON	7439-89-6	6560	65800 J	26966.4	26966.4	NC	NC	NC	**5500 N**	NC	NC	NC	100000 N
LEAD	7439-92-1	8.86	228 J	54.5	54.5	NC	NC	400	NC	NC	NC	800	NC
MAGNESIUM	7439-95-4	3150	81500	26891.8	26891.8	NC	NC	325000	NC	NC	NC	NC	NC
MANGANESE	7439-96-5	203	1690	661.5	661.5	6900 N	NC	**160 N**	NC	9100 N	NC	4100 N	NC
MERCURY*#	7439-97-6	0.0	0.5	0.1	0.1	1 N	NC	2.3 N	NC	1.6 N	NC	61 N	NC
NICKEL	7440-02-0	4.4	44.4 J	23.2	23.2	13000 C	NC	160 N	NC	21000 C	NC	4100 N	NC

TABLE 5-2

HUMAN HEALTH SUBSURFACE SOIL SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	TACO - Construction Worker Soil Ingestion(6)	NON-TACO - Construction Worker Soil Ingestion(10)	TACO - Construction Worker Soil Inhalation(9)	NON-TACO - Construction Worker Soil Inhalation(8)	ORNL Residential Soil Criteria(5)	ORNL Industrial Soil Criteria(5)	USEPA Residential Inhalation SSLs(7)	USEPA Industrial SSLs for Inhalation(7)	USEPA Construction Worker Direct Contact SSLs(6)	USEPA Construction Worker Inhalation SSLs(6)	COPC Flag(17)	Rationale for Contaminant Deletion or Selection
Pesticides/PCBs (ug/kg)												
ENDOSULFAN SULFATE	NC	NC	NC	NC	37000 N	370000 N	NC	NC	NC	NC	NO	BSL
ENDRIN	6100 N	NC	NC	NC	1800 N	18000 N	NC	NC	7100 N	NC	NO	BSL
ENDRIN ALDEHYDE	NC	NC	NC	NC	1800 N	18000 N	NC	NC	NC	NC	NO	BSL
ENDRIN + ENDRIN ALDEHYDE	6100 N	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
ENDRIN KETONE	NC	NC	NC	NC	1800 N	18000 N	NC	NC	NC	NC	NO	BSL
GAMMA-BHC (LINDANE; GAMMA-HEXACHLOROCYCLOHEXANE)	96000 C	NC	NC	NC	520 C	2100 C	NC	NC	18000 C	800000 C	NO	BSL
GAMMA-CHLORDANE	NC	NC	NC	NC	1600 C	6500 C	72000 C	130000 C	55000 C	2500000 C	NO	BSL
HEPTACHLOR EPOXIDE	270 N	NC	13000 C	NC	53 C	190 C	4700 C	8800 C	1800 C	96000 C	NO	BSL
METHOXYCHLOR	100000 N	NC	NC	NC	31000 N	310000 N	NC	NC	120000 N	NC	NO	BSL
ALPHA + GAMMA CHLORDANE	100000 C	NC	NC	22000 C	NC	NC	NC	NC	NC	NC	NO	BSL
Dioxins/Furans (ng/kg)												
1,2,3,4,6,7,8,9-OCDD	NC	NC	NC	NC	15000 C	60000 C	NC	NC	NC	NC	NO	BSL
1,2,3,4,6,7,8,9-OCDF	NC	NC	NC	NC	15000 C	60000 C	NC	NC	NC	NC	NO	BSL
1,2,3,4,6,7,8-HPCDD	NC	NC	NC	NC	450 C	1800 C	NC	NC	NC	NC	NO	BSL
1,2,3,4,6,7,8-HPCDF	NC	NC	NC	NC	450 C	1800 C	NC	NC	NC	NC	NO	BSL
1,2,3,4,7,8,9-HPCDF	NC	NC	NC	NC	450 C	1800 C	NC	NC	NC	NC	NO	BSL
1,2,3,4,7,8-HXCDD	NC	NC	NC	NC	45 C	180 C	NC	NC	NC	NC	NO	BSL
1,2,3,4,7,8-HXCDF	NC	NC	NC	NC	45 C	180 C	NC	NC	NC	NC	NO	BSL
1,2,3,6,7,8-HXCDD	NC	NC	NC	NC	45 C	180 C	NC	NC	NC	NC	NO	BSL
1,2,3,6,7,8-HXCDF	NC	NC	NC	NC	45 C	180 C	NC	NC	NC	NC	NO	BSL
1,2,3,7,8,9-HXCDD	NC	NC	NC	NC	94 C	390 C	2540000 C	4750000 C	3200 C	190000 C	NO	BSL
1,2,3,7,8,9-HXCDF	NC	NC	NC	NC	45 C	180 C	NC	NC	NC	NC	NO	BSL
1,2,3,7,8-PECDD	NC	NC	NC	NC	4.5 C	18 C	NC	NC	NC	NC	NO	BSL
2,3,4,6,7,8-HXCDF	NC	NC	NC	NC	45 C	180 C	NC	NC	NC	NC	NO	BSL
2,3,4,7,8-PECDF	NC	NC	NC	NC	15 C	60 C	NC	NC	NC	NC	NO	BSL
2,3,7,8-TCDD	NC	NC	NC	NC	4.5 C	18 C	42 C	79 C	150 C	6500 C	YES	ASL
TEQ FULLND	NC	NC	NC	NC	4.5 C	18 C	NC	NC	NC	NC	NO	BSL
TOTAL HPCDD	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
TOTAL HPCDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
TOTAL HXCDD	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
TOTAL HXCDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
TOTAL PECDD	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
TOTAL PECDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
TOTAL TCDD	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
TOTAL TCDF	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
Herbicides (ug/kg)						0						
2,4-D (Dichlorophenoxy Acetic Acid, 2,4-)	200000 N	NC	NC	NC	69000 N	770000 N	NC	NC	270000 N	NC	NO	BSL
DICAMBA	NC	NC	NC	NC	180000 N	1800000 N	NC	NC	710000 N	NC	NO	BSL
Inorganics (mg/kg)												
ALUMINUM	NC	41000 N	NC	87000 N	**7700 N**	99000 N	709000 N	1100000 N	31000 N	**1800 N**	YES	ASL
ANTIMONY	8.2 N	NC	NC	NC	3.1 N	41 N	NC	NC	12 N	NC	NO	BSL
ARSENIC	**61 N**	NC	25000 C	NC	**0.39 C**	**1.6 C**	769 C	1440 C	**13 C**	**5.3 N**	YES	ASL
BARIUM	1400 N	NC	87000 N	NC	1500 N	19000 N	70900 N	110000 N	6200 N	180 N	NO	BSL
BERYLLIUM	41 N	NC	44000 C	NC	16 N	200 N	1380 C	2570 C	62 N	7.1 N	NO	BSL
CADMIUM	20 N	NC	59000 C	NC	**7 N**	80 N	1840 C	3430 C	28 N	**3.6 N**	YES	ASL
CALCIUM	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
CHROMIUM	410 N	NC	69 N	NC	NC	NC	276 C	515 C	NC	NC	YES	ASL
COBALT	1200 N	NC	NC	NC	**2.3 N**	30 N	1180 C	2210 C	**9.3 N**	**2.1 N**	YES	ASL
COPPER	820 N	NC	NC	NC	310 N	4100 N	NC	NC	1200 N	NC	NO	BSL
IRON	NC	**14000 N**	NC	NC	**5500 N**	72000 N	NC	NC	**22000 N**	NC	NO	BSL
LEAD	700	NC	NC	NC	400 N	800 N	NC	NC	NC	NC	NO	BSL
MAGNESIUM	730000	NC	NC	NC	NC	NC	NC	NC	NC	NC	NO	BSL
MANGANESE	**410 N**	NC	**870 N**	NC	**180 N**	2300 N	7090 N	11000 N	4300 N	**18 N**	YES	ASL
MERCURY*#	6.1 N	NC	**0.01 N**	NC	0.56 N	3.4 N	2.9 sat	2.9 SAT	5 N	110 N	YES	ASL
NICKEL	410 N	NC	440000 C	NC	150 N	2000 N	NC	NC	620 N	320 N	NO	BSL

TABLE 5-2

HUMAN HEALTH SUBSURFACE SOIL SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS No.	Minimum Result	Maximum Result	Average Positive Result	Overall Average	TACO - Residential Soil Inhalation[8]	NON-TACO - Residential Soil Inhalation[9]	TACO - Residential Soil Ingestion[8]	NON-TACO - Residential Soil Ingestion[9]	TACO - Industrial - Commercial Soil Inhalation[8]	NON-TACO - Industrial/ Commercial Soil Inhalation[9]	TACO - Industrial - Commercial Soil Ingestion[8]	NON-TACO - Industrial Commercial Soil Ingestion[10]
Inorganics (mg/kg)													
POTASSIUM	7440-09-7	558	1930	1035.1	1035.1	NC	NC	NC	NC	NC	NC	NC	NC
SELENIUM	7782-49-2	1.3 J	1.3 J	1.3	0.5	NC	NC	39 N	NC	NC	NC	1000 N	NC
SODIUM	7440-23-5	210	3370	1043.2	1043.2	NC	NC	NC	NC	NC	NC	NC	NC
VANADIUM	7440-62-2	10.5	33.5	19.0	19.0	NC	NC	55 N	NC	NC	NC	1400 N	NC
ZINC	7440-66-6	38.5	1010 J	184.5	184.5	NC	NC	2300 N	NC	NC	NC	61000 N	NC

TABLE 5-2

HUMAN HEALTH SUBSURFACE SOIL SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	TACO - Construction Worker Soil Ingestion(8)		NON-TACO - Construction Worker Soil Ingestion(10)	TACO - Construction Worker Soil Inhalation(9)	NON-TACO - Construction Worker Soil Inhalation(8)	ORNL Residential Soil Criteria(5)		ORNL Industrial Soil Criteria(5)		USEPA Residential Inhalation SSLs(7)	USEPA Industrial SSLs for Inhalation(7)	USEPA Construction Worker Direct Contact SSLs(6)		USEPA Construction Worker Inhalation SSLs(6)		COPC Flag(17)	Rationale for Contaminant Deletion or Selection
Inorganics (mg/kg)																	
POTASSIUM	NC		NC	NC	NC	NC		NC		NC	NC	NC		NC		NO	BSL
SELENIUM	100	N	NC	NC	NC	39	N	510	N	NC	NC	150	N	7100	N	NO	BSL
SODIUM	NC		NC	NC	NC	NC		NC		NC	NC	NC		NC		NO	BSL
VANADIUM	140	N	NC	NC	NC	39	N	520	N	NC	NC	2.2	N	36	N	YES	ASL
ZINC	6100	N	NC	NC	NC	2300	N	31000	N	NC	NC	9300	N	NC		NO	BSL

Associated Samples:
NTC21SB02-SO-0204
NTC21SB02-SO-0406
NTC21SB03-SO-0204
NTC21SB04-SO-0406
NTC21SB05-SO-0204
NTC21SB06-SO-0204
NTC21SB07-SO-0204
NTC21SB08-SO-0204
NTC21SB09-SO-0204
NTC21SB10-SO-0406
NTC21SB11-SO-0204
NTC21SB12-SO-0204
NTC21SB13-SO-0204
NTC21SB14-SO-0204
NTC21SB15-SO-0204
NTC21SB16-SO-0204
NTC21SB17-SO-0507
NTC21SB18-SO-0507

Definitions:
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Non-carcinogen
NC = No criteria

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level

For Elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient

Footnotes:
1 - Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 - The maximum detected concentration is used for screening purposes
3 - Illinois EPA Remediation Objectives for Class 1 Groundwater (online 2010).
4 - Background data used - Illinois EPA background concentration (Illinois EPA, Appendix A, Table G of TACO)
5 - USEPA ORNL Screening Level. The noncarcinogenic values (denoted with a "N" flag) are the ORNL value divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag) (USEPA Region IX, October 2004, Updated December 28, 2004).
6 - Soil Screening Levels for Migration from Soil to Air for Construction Worker Scenario were calculated by Tetra Tech, NUS using methodology and equations presented in the Supplemental Guidance For Developing Soil Screening Levels for Superfund Sites, OSWER 93355.4-24, December 2002.
7 - SSLs for the migration of chemicals from soil to groundwater and soil to air were calculated by Tetra Tech, NUS using the methodology and equations presented in the Supplemental Guidance For Developing Soil Screening Levels for Superfund Sites, OSWER 93355.4-24, December 2002 and online at http://rais.ornl.gov/epa/ssl1.shtml since these values are more recent than those published in the 1996 and 2002 SSL guidance documents.
8 - Section 742 Table A, Tier 1, Soil Remediation Objectives - Residential/Industrial/Commercial (Ingestion or Inhalation)(Online, 2010)
9 - Soil Remediation Objectives for Residential/Industrial/Commercial roperties, Non-TACO Chemicals (2010)
10 - Ten percent of the noncarcinogenic value is less than the carcinogenic value, therefore the noncarcinogenic value is presented.
11 - Values are for hexavalent chromium.
12 - Acenaphthene is used as a surrogate for acenaphthylene
13 - Pyrene is used as a surrogate for benzo(ghi)perylene and phenanthrene
14 - Nickle criteria based on nickle soluble salts
15 - TACO table footnote indicates that elemental Hg " Inhalation remediation objective only applies at sites where elemental mercury is a contaminant of concern."
16 - COPC flag for construction worker inhalation scenario only
17 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.

BAP equivalent criteria based on BaP
Chlordane used as a surrogate for alpha + gamma chlordane
Endrin used as a surrogate for endrin + endrin aldehyde
Endosulfan used as a surrogate for endosulfan I
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.
* Inhalation pathway only
# Construction worker scenario only

TABLE 5-3

HUMAN HEALTH GROUNDWATER SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS No.	Minimum Result[1]	Maximum Result[1,2]	Average Positive Result	Overall Average	TACO Class 1 Groundwater Criteria[3]	Non-TACO Class 1 Groundwater Criteria[4]	USEPA ORNL Tapwater Criteria[5]		USEPA MCL Criteria[6]	Vapor Intrusion Screening Criteria[7]	COPC Flag[8]	Rationale for Contaminant Delection or Selection[8]
Volatile Organics (ug/L)													
ACETONE	67-64-1	1.8 J	4.6 J	3.12	2.67	6300	NC	2200	N	NC	220000	NO	BSL
BENZENE	71-43-2	0.96 J	0.96 J	0.96	0.205833	5	NC	**0.41**	C	5	5	YES	ASL
CIS-1,2-DICHLOROETHENE	156-59-2	0.79 J	0.79 J	0.79	0.185833	70	NC	37	N	70	210	NO	BSL
METHYL TERT-BUTYL ETHER	1634-04-4	1.6	1.6	1.6	0.308333	70	NC	12	C	NC	120000	NO	BSL
TETRACHLOROETHENE	127-18-4	0.85 J	0.85 J	0.85	0.204166	5	NC	**0.11**	C	5	5	YES	ASL
TRICHLOROFLUOROMETHANE	75-69-4	2.5	2.5	2.5	0.4875	NC	NC	130	N	NC	180	NO	BSL
Semivolatile Organics (ug/L)													
ACENAPHTHENE	83-32-9	0.02 J	0.02 J	0.02	0.019166	420	NC	220	N	NC	NC	NO	BSL
ANTHRACENE	120-12-7	0.03 J	0.04 J	0.035	0.018333	2100	NC	1100	N	NC	NC	NO	BSL
BAP EQUIVALENT-FULLND	NA	0.02311	0.06146	0.045783	0.045783	NC	NC	**0.0029**	C	NC	NC	YES	ASL
BENZO(A)ANTHRACENE	56-55-3	0.04 J	0.05 J	0.045	0.023333	0.13	NC	**0.029**	C	NC	NC	YES	ASL
BENZO(A)PYRENE	50-32-8	0.03 J	0.03 J	0.03	0.016666	0.2	NC	**0.0029**	C	0.2	NC	YES	ASL
BENZO(B)FLUORANTHENE	205-99-2	0.03 J	0.03 J	0.03	0.0175	0.18	NC	**0.029**	C	NC	NC	YES	ASL
BENZO(K)FLUORANTHENE	207-08-9	0.03 J	0.03 J	0.03	0.0175	0.17	NC	0.29	C	NC	NC	NO	BSL
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	1.8 J	1.8 J	1.8	0.8	6	NC	4.8	C	6	NC	NO	BSL
CHRYSENE	218-01-9	0.04 J	0.05 J	0.045	0.024166	1.5	NC	2.9	C	NC	NC	NO	BSL
FLUORANTHENE	206-44-0	0.03 J	0.06	0.043333	0.0375	280	NC	150	N	NC	NC	NO	BSL
FLUORENE	86-73-7	0.02 J	0.03 J	0.025	0.015833	280	NC	150	N	NC	NC	NO	BSL
PENTACHLOROPHENOL	87-86-5	7.8 J	7.8 J	7.8	1.696666	**1**	NC	**0.56**	C	**1**	NC	YES	ASL
PYRENE	129-00-0	0.03 J	0.05 J	0.043333	0.0375	210	NC	110	N	NC	NC	NO	BSL
TOTAL PAHS-FULLND	NA	0.18	0.89	0.491666	0.491666	NC	NC	NC		NC	NC	NO	BSL
Pesticides/PCBs (ug/L)													
ALPHA-CHLORDANE	5103-71-9	0.00385 J	0.00385 J	0.00385	0.001985	NC	NC	NC		NC	NC	NO	BSL
DELTA-BHC (DELTA-HCH)	319-86-8	0.00801 J	0.02	0.014005	0.005742	NC	NC	**0.011**	C	NC	NC	YES	ASL
GAMMA-CHLORDANE	5103-74-2	0.00311 J	0.00311 J	0.00311	0.001862	NC	NC	NC		NC	NC	NO	BSL
TOTAL CHLORDANE (ALPHA + GAMMA)[9]	NA	0.00696	0.00696	0.00348	0.0019235	2	NC	0.19	C	2	NC	NO	BSL
Dioxins (pg/L)													
TEQ FULLND	NA	12.34382	12.3438	12.34382	12.34382	NC	NC	**0.52**	C	30	NC	YES	ASL
Herbicides (ug/L)													
2,4,5-TP (SILVEX)	93-72-1	0.03 J	0.03 J	0.03	0.013333	50	NC	29	N	50	NC	NO	BSL
2,4-DB	94-82-6	0.62 J	0.62 J	0.62	0.203333	NC	NC	29	N	NC	NC	NO	BSL
DALAPON	75-99-0	0.75 J	0.75 J	0.75	0.379166	200	NC	110	N	200	NC	NO	BSL
DICHLOROPROP	120-36-5	0.34 J	0.78 J	0.54	0.33	NC	NC	NC		NC	NC	NO	BSL
Inorganics (ug/L)													
ALUMINUM	7429-90-5	122	668 J	298	250.416666	NC	3500	3700	N	NC	NC	NO	BSL
ARSENIC	7440-38-2	0.88 J	7.26 J	2.802	2.3975	50	NC	**0.045**	C	10	NC	YES	ASL
BARIUM	7440-39-3	32.3	422	127.15	127.15	2000	NC	730	N	2000	NC	NO	BSL
CADMIUM	7440-43-9	0.69	3.45	1.341666	1.341666	5	NC	**1.8**	N	5	NC	YES	ASL
CALCIUM	7440-70-2	96600	671000	318100	318100	NC	NC	NC		NC	NC	NO	BSL
CHROMIUM	7440-47-3	4.13	4.13	4.13	1.084166	100	NC	NC		100	NC	NO	BSL
COBALT	7440-48-4	3.55	15.3	7.833333	4.229166	1000	NC	**1.1**	N	NC	NC	YES	ASL
COPPER	7440-50-8	4.25 J	4.25 J	4.25	1.229166	650	NC	150	N	1300	NC	NO	BSL
IRON	7439-89-6	22.3	34000	6265.933333	6265.93333	**5000**	**5000**	**2600**	N	NC	NC	YES	ASL

TABLE 5-3

HUMAN HEALTH GROUNDWATER SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS No.	Minimum Result[1]	Maximum Result[1,2]	Average Positive Result	Overall Average	TACO Class 1 Groundwater Criteria[3]	Non-TACO Class 1 Groundwater Criteria[4]	USEPA ORNL Tapwater Criteria[5]	USEPA MCL Criteria[6]	Vapor Intrusion Screening Criteria[7]	COPC Flag[8]	Rationale for Contaminant Delection or Selection[8]
Inorganics (ug/L)												
LEAD	7439-92-1	0.83	0.83	0.83	1.608333	7.5	NC	NC	15	NC	NO	BSL
MAGNESIUM	7439-95-4	608	125000	57851.33333	57851.3333	NC	NC	NC	NC	NC	NO	BSL
MANGANESE	7439-96-5	0.89	5400	1803.365	1803.365	150	NC	88 N	NC	NC	YES	ASL
NICKEL	7440-02-0	0.75	11.3	3.26	2.779166	100	NC	73 N	NC	NC	NO	BSL
POTASSIUM	7440-09-7	2980	40200 J	13736.66667	13736.6667	NC	NC	NC	NC	NC	NO	BSL
SELENIUM	7782-49-2	1.63	1.63	1.63	2.084166	50	NC	18 N	50	NC	NO	BSL
SILVER	7440-22-4	0.47 J	1.3	0.885	0.378333	50	NC	18 N	NC	NC	NO	BSL
SODIUM	7440-23-5	55700	1040000	593950	593950	NC	NC	NC	NC	NC	NO	BSL
VANADIUM	7440-62-2	4.36	4.36	4.36	1.2475	49	NC	18 N	NC	NC	NO	BSL
ZINC	7440-66-6	1.5	2.83	2.165	4.988333	5000	NC	1100 N	NC	NC	NO	BSL

Associated Samples:
NTC21MW0101
NTC21MW0201
NTC21MW0301
NTC21MW0401
NTC21MW0501
NTC21MW0601

Definitions:
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Non-carcinogen
NA = Not applicable/not available.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level

For Elimination as a COPC:
BSL = Below COPC screening level
NUT = Essential nutrient

Footnotes:
1 - Duplicate analytical results are not be used for the EPC calculations. Data values less than sample-specific detection limits are reported as the detection limit.
2 - The maximum detected concentration is used for screening purposes.
3 - Illinois EPA Remediation Objectives for Class 1 Groundwater (online 2010).
4 - Groundwater Remediation Objectives for Chemicals Not Listed in TACO (Illinois EPA, May 1, 2007).
5 - USEPA ORNL Tap Water Screening Level. The non-carcinogenic values (denoted with a "N" flag) are the PRG divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag) (USEPA, 2008).
6 - Federal Maximum Contaminant Level (USEPA, 2006).
7 - Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (USEPA, 2002). Values are from Table 2c and correspond to a target cancer risk level of 1E-6 or hazard index =1 and an attenuation factor of 0.001.
8 - The chemical is selected as a COPC if the maximum detected concentration exceeds the screening level.
USEPA ORNL tapwater criteria for acenaphthene is used as a surrogate for acenaphthylene.
Illinois EPA TACO criteria for chlordane are compared to the sum of alpha- and gamma-chlordane.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

TABLE 5-4

CHEMICALS RETAINED AS COPCs
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical	Surface Soil		Subsurface Soil		Groundwater	
	Direct Contact	Soil to Air	Direct Contact	Soil to Air	Direct Contact	Vapor Intrusion
Volatile Organic Compounds						
BENZENE					X	
TETRACHLOROETHENE					X	
Semivolatile Organic Compounds						
BAP EQUIVALENT-FULLND	X		X		X	
BENZO(A)ANTHRACENE	X		X		X	
BENZO(A)PYRENE	X		X		X	
BENZO(B)FLUORANTHENE	X		X		X	
BENZO(K)FLUORANTHENE	X		X			
CHRYSENE	X		X			
DIBENZO(A,H)ANTHRACENE	X		X			
INDENO(1,2,3-CD)PYRENE	X		X			
PENTACHLOROPHENOL					X	
NAPTHALENE		X*	X	X*		
Pesticides/PCBs (ug/L)						
AROCLOR-1260	X		X			
DELTA-BHC (DELTA-HCH)					X	
Dioxins						
1,2,3,7,8-PECDD	X					
2,3,4,7,8-PECDF	X					
TEQ FULLND	X		X		X	
Inorganics						
ALUMINUM	X	X*	X	X*		
ANTIMONY	X					
ARSENIC	X	X*	X	X*	X	
BARIUM		X*				
CADMIUM	X	X*	X	X*	X	
CHROMIUM	X	X*	X			
COBALT	X	X*	X	X*	X	
COPPER	X					
IRON	X		X		X	
MANGANESE	X	X*	X	X*	X	
MERCURY	X	X		X*		
VANADIUM	X		X			

Notes:

X - Indicates chemical was retained as a COPC.

*Construction worker scenario only

TABLE 5-5

HUMAN HEALTH RISK ASSESSMENT
EXPOSURE ROUTES FOR POSSIBLE QUANTITATIVE EVALUATION
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Receptors	Exposure Routes
Construction Workers (future land use)	• Surface Soil - Dermal Contact • Surface Soil - Incidental Ingestion • Subsurface Soil - Dermal Contact • Subsurface Soil - Incidental Ingestion • Inhalation of Air/Dust • Groundwater - Dermal Contact (during excavation) • Groundwater Inhalation of Volatiles in a Trench (during excavation)
Adolescent Trespasser (current land use)	• Surface Soil - Dermal Contact • Surface Soil - Incidental Ingestion • Inhalation of Air/Dust
Maintenance/Occupational Workers (future and current land use)	• Surface Soil - Dermal Contact • Surface Soil - Incidental Ingestion • Inhalation of Air/Dust
On-Base Military Residents (Adult/Children) (future land use)	• Surface Soil - Dermal Contact • Surface Soil - Incidental Ingestion • Subsurface Soil - Dermal Contact(1) • Subsurface Soil - Incidental Ingestion(1) • Inhalation of Air/Dust • Groundwater - Dermal Contact • Groundwater - Ingestion • Groundwater - Inhalation of Volatiles
Onsite Civilian Residents (Adult/Children) (future land use)	• Surface Soil - Dermal Contact • Surface Soil - Incidental Ingestion • Subsurface Soil - Dermal Contact(1) • Subsurface Soil - Incidental Ingestion(1) • Inhalation of Air/Dust • Groundwater - Dermal Contact • Groundwater - Ingestion • Groundwater - Inhalation of Volatiles

(1) Exposure to subsurface soil for maintenance/occupational workers and future residents will be evaluated to account for the possibility that subsurface soil may be brought to the surface in a future excavation project

TABLE 5-6

EXPOSURE POINT CONCENTRATION SUMMARY - SUBSURFACE SOIL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Construction excavation or post-construction excavation

Chemical of Potential Concern	Units	# Detects/ # Samples	RME Maximum Detected Concentration	Maximum Qualifier	CTE Mean Concentration
PAHs/Semivolatile Organic Compounds					
BAP EQUIVALENT	mg/kg	22/22	39.4		2.32
NAPHTHALENE	mg/kg	16/22	4.6		0.433
Pesticides/PCBs					
AROCLOR-1260	mg/kg	8/22	0.44	J	0.0704
Dioxins/Furans					
TCDD TEQ full NDs [1]	mg/kg	1/1	5.62E-06		5.62E-06
Inorganics					
ALUMINUM	mg/kg	22/22	24,300		9,340
ARSENIC	mg/kg	22/22	85	J	12.06
CADMIUM	mg/kg	20/22	9.62		1.24
CHROMIUM	mg/kg	22/22	34.3	J	15.1
COBALT	mg/kg	22/22	23.8		8.90
IRON	mg/kg	22/22	65,800	J	26,970
MANGANESE	mg/kg	22/22	1,690		662
MERCURY[*#]	mg/kg	21/22	0.484		0.0999
VANADIUM	mg/kg	22/22	33.5		19.0

Footnotes:
[*] COPC for inhalation pathway only.
[#] COPC for construction worker scenario only.
[1] No mean calculation for 1 sample dataset. CTE uses detected concentration of TCDD TEQ.

TABLE 5-7

EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

Chemical of Potential Concern	Units	# Detects/ # Samples	Arithmetic Mean	Maximum Detection	EPC Units	Dataset Distribution	95% UCL of the Mean Statistic	RME[1] EPC 95% UCL	CTE[2] EPC Mean
PAHs/Semivolatile Organic Compounds									
AROCLOR 1260	mg/kg	12/22	0.154 [3]	0.720	mg/kg	nonparametric	95% KM(Percentile Bootstrap) UCL	0.223	0.154
BAP EQUIVALENT	mg/kg	22/22	3.566	50.6	mg/kg	lognormal	95% Chebyshev UCL	13.47	3.566
NAPHTHALENE [4]	mg/kg	22/22	0.24	0.52	mg/kg	--	--	0.52	0.24
Dioxins/Furans									
2,3,7,8-TCDD[5]	mg/kg	2/2	--	8.16E-07	mg/kg	--	--	8.16E-07	8.16E-07
TCDD TEQs full NDs[5]	mg/kg	2/2	--	3.35E-05	mg/kg	--	--	3.35E-05	3.35E-05
Inorganics									
ALUMINUM	mg/kg	22/22	7,623	29,500	mg/kg	LN, gamma	95% Approx Gamma UCL	9,888	7,623
ANTIMONY	mg/kg	6/22	1.06 [3]	5.22	mg/kg	nonparametric	95% KM(Percentile Bootstrap) UCL	2.03	1.06
ARSENIC	mg/kg	22/22	12.46	48.4	mg/kg	nonparametric	95% Chebyshev UCL	23.83	12.46
BARIUM	mg/kg	22/22	76.4	234	mg/kg	LN, gamma	95% Approx Gamma UCL	94.7	76.4
CADMIUM	mg/kg	21/22	2.30	13	mg/kg	nonparametric	97.5% KM(Chebyshev) UCL	6.44	2.3
CHROMIUM	mg/kg	22/22	20.26	163	mg/kg	nonparametric	95% Chebyshev UCL	50.47	20.3
COBALT	mg/kg	22/22	6.59	17.7	mg/kg	LN, gamma	95% Approx Gamma UCL	8.07	6.6
COPPER	mg/kg	22/22	93.6	835	mg/kg	nonparametric	95% Chebyshev UCL	258.2	93.6
IRON	mg/kg	22/22	26,762	69,500	mg/kg	lognormal	95% H-UCL	33,612	26,762
MANGANESE	mg/kg	22/22	588.6	2,420	mg/kg	LN, gamma	95% Approx Gamma UCL	769.2	588.6
MERCURY	mg/kg	22/22	0.57	8.98	mg/kg	nonparametric	95% Chebyshev UCL	2.33	0.57
VANADIUM	mg/kg	22/22	16.68	25.7	mg/kg	normal	95% Student's-t UCL	18.55	16.7

Footnotes:

1. 95UCL for RME scenario except for construction workers and residential scenario; EPCs for soil for these receptors are the maximum detections of COPCs.
2. Mean is the EPC for each soil COPC in the CTE scenarios.
3. Kaplan-Meier statistical mean (with NDs included)
4. Naphthalene is a COPC only for subsurface soil and the inhalation pathway. Included in the CW inhalation exposure risk for surface soil (max. for RME; mean for CTE)
5. Only two samples, so meaningful summary statistics could not be calculated for this dataset.

TABLE 5-8

EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Scenario Timeframe: Future Medium: Groundwater Exposure Medium: Groundwater Exposure Point: Construction Excavation; Hypothetical Residential Potable Water

Chemical of Potential Concern	Units	# Detects/ # Samples	Maximum Detected Concentration	Maximum Qualifier
Volatile Organics (ug/L)				
BENZENE	ug/L	1/6	0.960	J
TETRACHLOROETHENE	ug/L	1/6	0.850	J
PAHs/Semivolatile Organic Compounds				
BAP EQUIVALENT	ug/L	2/6	0.038	
PENTACHLOROPHENOL	ug/L	1/6	7.8	J
Pesticides/PCBs (ug/L)				
DELTA-BHC (DELTA-HCH)	ug/L	2/6	0.02	
Dioxins/Furans				
TCDD TEQs full NDs	ug/L	1/1	1.23E-05	
Inorganics				
ARSENIC	ug/L	5/6	7.26	J
CADMIUM	ug/L	6/6	3.45	
COBALT	ug/L	3/6	15.3	
IRON	ug/L	6/6	34000	
MANGANESE	ug/L	6/6	5400	

Footnotes:
ug/L = microgram per liter.
J = Estimated value.
PAH = Polynuclear aromatic hydrocarbon.
PCB = Polychlorinated biphenyl.

TABLE 5-9

SUMMARY OF EXPOSURE INPUT PARAMETERS
REASONABLE MAXIMUM EXPOSURES
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Exposure Parameter	Occupational/ Maintenance Worker	Adolescent Trespasser	Construction Worker	On-Site Adult Resident	On-Site Child Resident
All Exposures					
C_{soil} (mg/kg)	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]
C_{gw} (µg/L)	NA	NA	Maximum	Maximum	Maximum
EF (days/year)	250[3]	26[5]	30[2]	350[5]	350[5]
ED (years)	25[3]	10[5]	1[4]	24[5]	6[5]
BW (kg)	70[5]	42[5]	70[5]	70[5]	15[5]
AT_n (days)	9,125[9]	3650[9]	42[8]	8,760[9]	2,190[9]
AT_c (days)	25,550[9]	25,550[9]	25,550[9]	25,550[9]	25,550[9]
Incidental Ingestion/Dermal Contact with Soil					
IR (mg/day)	100[5]	100[5]	330[10]	100[5]	200[5]
FI (unitless)	1[5]	1[5]	1[5]	1[5]	1[5]
SA (cm^2/day)	3,280[11]	3,280[11]	3,280[11]	5,700[11]	2,800[11]
AF (mg/cm^2)	0.2[11]	0.2[11]	0.3[11]	0.07[11]	0.2[11]
ABS (unitless)	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]
CF (kg/mg)	1E-06	1E-06	1E-06	1E-06	1E-06
Inhalation Fugitive Dust/Volatile Emissions from Soil					
C_{air} (mg/m^3)	calculated[10]	calculated[10]	calculated[10]	calculated[10]	calculated[10]
ET (hours/day)	8[10]	2[10]	8[12]	24[10]	24[7]
PEF (m^3/kg)	1.36E+9[10]	1.36E+9[10]	1.27×10^{6}[10]	1.36E+9[10]	1.36E+9[10]
VF (m^3/kg)	chemical-specific[10]	chemical-specific[10]	chemical-specific[10]	chemical-specific[10]	chemical-specific[10]

TABLE 5-9

SUMMARY OF EXPOSURE INPUT PARAMETERS
REASONABLE MAXIMUM EXPOSURES
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Exposure Parameter	Occupational/ Maintenance Worker	Adolescent Trespasser	Construction Worker	On-Site Adult Resident	On-Site Child Resident
Ingestion/Dermal Contact with Groundwater					
IR_{gw} (L/day)	NA	NA	NA	2(5)	1.5(7)
ET (hours/day) and t_{event} (hours/event)	NA	NA	4(4)	0.33(4)	0.33(4)
EV (events/day)	NA	NA	1(4)	1(4)	1(4)
A (cm^2/day)	NA	NA	3,300(11)	18,000(11)	6,600(11)
K_p (cm/hour)	NA	NA	chemical-specific(11)	chemical-specific(11)	chemical-specific(11)
t* (hours), t (hour), and B (unitless)	NA	NA	chemical-specific(11)	chemical-specific(11)	chemical-specific(11)

A Skin surface area available for contact
ABS Absorption factor
AF Soil-to-skin adherence factor
AT_c Averaging time for carcinogenic effects
AT_n Averaging time for non-carcinogenic effects
B Bunge Model partitioning coefficient
BW Body weight
CF Conversion factor
IR Ingestion rate
C_{soil} Exposure concentration for soil
C_{gw} Exposure concentration for groundwater
C_{air} Exposure concentration for air
ED Exposure duration
EF Exposure frequency
ET Exposure time
EV Event frequency
FI Fraction ingested from contaminated source
InhR Inhalation rate
IR Ingestion rate (soil or groundwater)
K_p Permeability coefficient from water through skin
SA Skin surface area available for contact
PEF Particulate emission factor
t Lag time
t* Time it takes to reach steady-state conditions
t_{event} Duration of event

1 - USEPA, 2002.
2 - Illinois EPA, 2004.
3 - USEPA, 1991
4- Professional judgment.
5 - USEPA, 1993
6 - Adolescents (7-16 years).
7 - USEPA, 1997
8 - Illinois EPA, 2003.
9 - USEPA, 1989
10 - USEPA, 2002
11 - USEPA, 2004
12 - Assume an 8-hour work shift.

Note: The exposure factors for future civilian and military residents are the same, except for exposure duration (ED) for adult military residents. Exposure duration for adult military residents was assumed to be the typical enlistment times of 6 years for the RME and CTE.

TABLE 5-10

SUMMARY OF EXPOSURE INPUT PARAMETERS
CENTRAL TENDENCY EXPOSURES
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Exposure Parameter	Occupational/ Maintenance Worker	Adolescent Trespasser	Construction Worker	On-Site Adult Resident	On-Site Child Resident
All Exposures					
C_{soil} (mg/kg)	Mean		Mean	Mean	Mean
C_{gw} (µg/L)	NA	NA	Maximum	Maximum	Maximum
EF (days/year)	219(3)		30(2)	234(3)	234(3)
ED (years)	9(3)		1(4)	7(3)	2(3)
BW (kg)	70(3)		70(3)	70(3)	15(3)
AT_n (days)	3,285(8)		42(7)	2,555(8)	730(8)
AT_c (days)	25,550(8)		25,550(8)	25,550(8)	25,550(8)
Incidental Ingestion/Dermal Contact with Soil					
IR (mg/day)	50(9)		165(9)	50(9)	100(9)
FI (unitless)	1(3)		1(3)	1(3)	1(3)
SA (cm^2/day)	3,300(10)		3,300(10)	5,700(10)	2,800(10)
AF (mg/cm^2)	0.02(10)		0.1(10)	0.01(10)	0.04(10)
ABS (unitless)	chemical-specific(10)		chemical-specific(10)	chemical-specific(10)	chemical-specific(10)
CF (kg/mg)	1E-06		1E-06	1E-06	1E-06
Inhalation Fugitive Dust/Volatile Emissions from Soil					
C_{air} (mg/m^3)	calculated(11)		calculated(11)	calculated(11)	calculated(11)
ET (hours/day)	4(9)		4(9)	24(11)	24(6)
PEF (m^3/kg)	1.36E+9(11)		1.27 x 10^6(11)	1.36E+9(11)	1.36E+9(11)
VF (m^3/kg)	chemical-specific(11)		chemical-specific(11)	chemical-specific(11)	chemical-specific(11)

TABLE 5-10

SUMMARY OF EXPOSURE INPUT PARAMETERS
CENTRAL TENDENCY EXPOSURES
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Exposure Parameter	Occupational/ Maintenance Worker	Adolescent Trespasser	Construction Worker	On-Site Adult Resident	On-Site Child Resident
Ingestion/Dermal Contact with Groundwater					
IR_{gw} (L/day)	NA	NA	NA	1.4(3)	0.66(6)
ET (hours/day) and t_{event} (hours/event)	NA	NA	2(8)	0.25(4)	0.25(4)
EV (events/day)	NA	NA	1(4)	1(4)	1(4)
A (cm^2/day)	NA	NA	3,300(10)	18,000(10)	6,600(10)
K_p (cm/hour)	NA	NA	chemical-specific(10)	chemical-specific(10)	chemical-specific(10)
t* (hours), τ (hour), and B (unitless)	NA	NA	chemical-specific(10)	chemical-specific(10)	chemical-specific(10)

Notes:

A Skin surface area available for contact
ABS Absorption factor
AF Soil-to-skin adherence factor
AT_c Averaging time for carcinogenic effects
AT_n Averaging time for non-carcinogenic effects
B Bunge Model partitioning coefficient
BW Body weight
CF Conversion factor
IR Ingestion rate
C_{soil} Exposure concentration for soil
C_{gw} Exposure concentration for groundwater
C_{air} Exposure concentration for air
ED Exposure duration
EF Exposure frequency
ET Exposure time
EV Event frequency
FI Fraction ingested from contaminated source
InhR Inhalation rate
IR Ingestion rate (soil or groundwater)
K_p Permeability coefficient from water through skin
SA Skin surface area available for contact
PEF Particulate emission factor
t Lag time
t* Time it takes to reach steady-state conditions
t_{event} Duration of event

1 - USEPA, 2002
2 - Illinois EPA, 2004.
3 - USEPA, 1993
4 - Professional judgment.
5 - Adolescents (7-16 years).
6 - USEPA, 1997
7 - Illinois EPA, 2003.
8 - USEPA, 1989
9 - CTE is assumed to be 1/2 the RME value.
10 - USEPA, 2004
11 - USEPA, 2002

Note: The exposure factors for future civilian and military residents are the same, except for exposure duration (ED) for adult military residents. Exposure duration for adult military residents was assumed to be the typical enlistment times of 6 years for the RME and CTE.

TABLE 5-11

NON-CANCER TOXICITY DATA - ORAL/DERMAL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal(1)	Absorbed RfD for Dermal(2)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source	Date
Semivolatile Organic Compounds										
BENZO(A)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NAPHTHALENE	Chronic	0.02	mg/kg/day	>50%	2.0E-02	mg/kg/day	body weight	3000/1	IRIS	Sep-98
TCDD TEQ (use 2,3,7,8-TCDD)	Chronic	1.00E-09	mg/kg/day	>50%	1.00E-09	mg/kg/day	developmental	NA	ATSDR	12/1998
PENTACHLOROPHENOL	Chronic	5.00E-03	mg/kg/day	>50%	5.00E-03	mg/kg/day	Liver (hepatox.)	300/1	IRIS	9/2010
Pesticides/PCBs										
AROCLOR 1260 (3)	Chronic	2.00E-05	mg/kg/day	>50%	2.00E-05	mg/kg/day	eye, immunolog.	300/1	IRIS	11/1996
DELTA-HEXACHLOROCYCLOHEXANE (3)	Chronic	8.00E-03	mg/kg/day	>50%	8.00E-03	mg/kg/day	Liver (hepatox.)	100	ATSDR	9/2005
Volatile Organic Compound										
BENZENE	Chronic	4.00E-03	mg/kg/day	>50%	4.00E-03	mg/kg/day	Hematological	300/1	IRIS	4/2003
TETRACHLOROETHYLENE	Chronic	1.00E-02	mg/kg/day	>50%	1.00E-02	mg/kg/day	Liver (hepatox.)	1000	IRIS	3/1/1988
Inorganics										
ALUMINUM	Chronic	1.0E+00	mg/kg/day	not available	1.0E+00	mg/kg/day	CNS	100	NCEA	10/23/2006
ANTIMONY	Chronic	4.0E-04	mg/kg/day	0.15	6.0E-05	mg/kg/day	longevity	1000	IRIS	2/1991
ARSENIC	Chronic	3.0E-04	mg/kg/day	>50%	3.0E-04	mg/kg/day	Skin, CVS	3/1	IRIS	4/2009
BARIUM	Chronic	2.0E-01	mg/kg/day	0.07	1.4E-02	mg/kg/day	Kidney (nephrtox.)	300	IRIS	7/2005
CADMIUM	Chronic	1.0E-03	mg/kg/day	0.025	2.5E-05	mg/kg/day	Kidney (proteinuria)	10/1	IRIS	2/1994
CHROMIUM VI	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	Fetotoxicity, GS, Bone	300/3	IRIS	2/2/2009
COBALT	Chronic	3.0E-04	mg/kg/day	not available	3.0E-04	mg/kg/day	Blood	NA	ORNL	9/12/2008
COPPER	Chronic	4.0E-02		not available	4.0E-02	mg/kg/day	GI	NA	HEAST	7/1997
IRON	Chronic	7.0E-01	mg/kg/day	not available	7.0E-01	mg/kg/day	GS	1.5	NCEA	9/11/2006
MANGANESE	Chronic	4.7E-02	mg/kg/day	0.04	1.9E-03	mg/kg/day	CNS	1/3	IRIS	4/2009
MERCURY(4)	Chronic	3.0E-04	mg/kg/day	0.07	2.1E-05	mg/kg/day	Autoimmune	1000/1	IRIS	2/2/2009
VANADIUM	Chronic	9.0E-03	mg/kg/day	0.026	2.3E-04	mg/kg/day	Kidney	100	IRIS	12/1/1996
ALUMINUM	Subchronic	2.0E+00	mg/kg/day	not available	2.0E+00	mg/kg/day	CNS	30	ATSDR	7/1999
ARSENIC	Subchronic	5.0E-03	mg/kg/day	>50%	5.0E-03	mg/kg/day	skin	10	PPRTV	8/2002
Chromium VI	Subchronic	2.0E-02	mg/kg/day	0.025	5.0E-04	mg/kg/day	NOAEL	100	HEAST	7/1997
MERCURY(4)	Subchronic	3.0E-03	mg/kg/day	0.07	2.1E-04	mg/kg/day	Autoimmune	100	HEAST	7/1997

Notes:
1 - USEPA, July 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.
3 - No RfD; used surrogates (Aroclor 1254 for Aroclor 1260, and a-BHC for d-BHC)
4 - Values are for mercuric chloride.
ATSDR = Agency for Toxic Substances and Disease Registry
PPRTV = Provisional Peer Reviewed Toxicity Value

Definitions:
CNS = Central nervous system
CVS = Cardiovascular system
GS = Gastrointestinal System
HEAST= Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
NA = Not applicable
NCEA = USEPA National Center for Environmental Assessment
ORNL = Oak Ridge National Laboratory Regional Screening Level tables, May 2010

TABLE 5-12

NON-CANCER TOXICITY DATA - INHALATION
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD[1]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
Semivolatile Organic Compounds									
BENZO(A)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
DIBENZO(A,H)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
NAPHTHALENE	Chronic	3.0E-03	mg/m^3	8.6E-04	(mg/kg/day)	Nasal	3000/1	IRIS	9/1998
TCDD TEQs (use 2,3,7,8-TCDD tox value)	Chronic	4.0E-08	mg/m^3	1.1E-08	(mg/kg/day)	NA	NA	CA EPA (per ORNL)	NA
PENTACHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides/PCBs									
AROCLOR 1260	NA	NA	NA	NA	NA	NA	NA	NA	NA
DELTA-HEXACHLOROCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compound									
BENZENE	Chronic	3.00E-02	mg/m3	8.6E-03	(mg/kg/day)	Hematological	300/1	IRIS	4/2003
TETRACHLOROETHYLENE	Chronic	2.7E-01	mg/m^3	7.7E-02	(mg/kg/day)	CNS	100	ATSDR (per ORNL)	9/1997
Inorganics									
ALUMINUM	Chronic	5.0E-03	mg/m^3	1.4E-03	(mg/kg/day)	CNS	300	NCEA	10/23/2006
ARSENIC	Chronic	1.50E-05	mg/m^3	4.3E-06	(mg/kg/day)	CNS, GI, heart	not available	CA EPA (per ORNL)	not available
BARIUM	Chronic	5.0E-04	mg/m^3	1.4E-04	(mg/kg/day)	Fetus	1000/1	HEAST	7/1997
CADMIUM	Chronic	1.0E-05	mg/m3	2.9E-06	(mg/kg/day)	Kidney	9	ATSDR	9/2008
CHROMIUM VI	Chronic	1.0E-04	mg/m^3	NA	(mg/kg/day)	Respiratory	300/1	IRIS	4/2009
COBALT	Chronic	6.0E-06	mg/m^3	NA	(mg/kg/day)	Respiratory	NA	ORNL	9/12/2008
IRON	NA	NA	NA	NA	NA	NA	NA	NA	NA
MANGANESE	Chronic	5.0E-05	mg/m^3	1.4E-05	(mg/kg/day)	CNS	1000/1	IRIS	4/2009
MERCURY	Chronic	3.0E-05	mg/m^3	8.6E-06	(mg/kg/day)	CNS	not available	CA EPA (per ORNL)	not available
VANADIUM	Chronic	7.0E-06	mg/m^3	2.0E-06	(mg/kg/day)	NA	not available	PPRTV (per ORNL)	not available
BARIUM	Subchronic	5.0E-03	mg/m^3	1.4E-03	(mg/kg/day)	Fetus	100	HEAST	7/1997

Notes:
1 - Extrapolated RfD = RfC $*20m^3$/day / 70 kg
ORNL = Oak Ridge National Laboratory Regional Screening Level tables, May 2010
PPRTV = Provisional Peer Reviewed Toxicity Value

Definitions:
IRIS = Integrated Risk Information System
CNS = Central Nervous System
HEAST= Health Effects Assessment Summary Tables
NA = Not Applicable
NCEA = USEPA National Center for Environmental Assessment
ORNL = Oak Ridge National Laboratory Screening Level Tables, September 2008
ATSDR = Agency for Toxic Substances and Disease Registry
CA EPA = California Envirnomental Protection Agency

TABLE 5-13

CANCER TOXICITY DATA - ORAL/DERMAL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal(1)	Absorbed Cancer Slope Factor for Dermal(2)		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source	Date
Semivolatile Organic Compounds								
BENZO(A)ANTHRACENE	7.3E-01	$(mg/kg/day)^{-1}$	>50%	7.3E-01	$(mg/kg/day)^{-1}$	B2	USEPA(1)	7/1993
BENZO(A)PYRENE	7.3E+00	$(mg/kg/day)^{-1}$	>50%	7.3E+00	$(mg/kg/day)^{-1}$	B2	IRIS	4/2009
BENZO(B)FLUORANTHENE	7.3E-01	$(mg/kg/day)^{-1}$	>50%	7.3E-01	$(mg/kg/day)^{-1}$	B2	USEPA(1)	7/1993
DIBENZO(A,H)ANTHRACENE	7.3E+00	$(mg/kg/day)^{-1}$	>50%	7.3E+00	$(mg/kg/day)^{-1}$	B2	USEPA(1)	7/1993
INDENO(1,2,3-CD)PYRENE	7.3E-01	$(mg/kg/day)^{-1}$	>50%	7.3E-01	$(mg/kg/day)^{-1}$	B2	USEPA(1)	7/1993
NAPHTHALENE	NA	NA	NA	NA	NA	C	IRIS	9/1998
TCDD TEQs (use 2,3,7,8-TCDD tox value)	1.5E+05	$(mg/kg/day)^{-1}$	>50%	1.5E+05	$(mg/kg/day)^{-1}$	B2	HEAST	7/1997
PENTACHLOROPHENOL	4.0E-01	(mg/kg/day)-1	>50%	4.0E-01	(mg/kg/day)-1	"Likely to be carcinogenic to humans"	IRIS	9/2010
Pesticides/PCBs								
AROCLOR 1260 (highly chlorinated PCB)	2.0E+00	(mg/kg/day)-1	>50%	2.0E+00	(mg/kg/day)-1	B2	IRIS	6/1997
DELTA-HEXACHLOROCYCLOHEXANE (3)	6.3E+00	(mg/kg/day)-1	>50%	6.3E+00	(mg/kg/day)-1	B2	IRIS	7/1993
Volatile Organic Compound								
BENZENE	5.5E-02	(mg/kg/day)-1	>50%	5.5E-02	(mg/kg/day)-1	A	IRIS	1/2000
TETRACHLOROETHYLENE	5.4E-01	$(mg/kg/day)^{-1}$	>50%	5.4E-01	(mg/kg/day)-1	Not Classified	A EPA (per ORNL	NA
Inorganics								
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	1.5E+00	$(mg/kg/day)^{-1}$	>50%	1.5E+00	$(mg/kg/day)^{-1}$	A	IRIS	4/2009
BARIUM	NA	NA	NA	NA	NA	D	IRIS	4/2009
CHROMIUM	NA	NA	NA	NA	NA	D/Not classifiable as to human carcinogenicity	IRIS	2/2/2009
COBALT	NA	NA	NA	NA	NA	NA	NA	NA
COPPER	NA	NA	NA	NA	NA	D	IRIS	8/1991
IRON	NA	NA	NA	NA	NA	NA	NA	NA
MANGANESE	NA	NA	NA	NA	NA	D	IRIS	4/2009
MERCURY	NA	NA	NA	NA	NA	C/Possible Human Carcinogen	IRIS	4/2009
VANADIUM	NA	NA	NA	NA	NA	NA	IRIS	6/1988

Notes:

1 - USEPA, 2004
2 - Adjusted dermal cancer slope factor = oral cancer slope factor/oral absorption efficiency for dermal
3 - No tox values for d-hexachlorocyclohexane (d-BHC); used surrogate tox values for a-BHC.

EPA Group:

A - Human carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available.
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans.
C - Possible human carcinogen.
D - Not classifiable as a human carcinogen.
E - Evidence of non-carcinogenicity.

Definitions:

IRIS = Integrated Risk Information System.
NA = Not available.
NCEA = National Center for Environmental Assessment, value from ORNL Regional Screening Level tables.
USEPA(1) = USEPA, 1993d
ORNL = Oak Ridge National Laboratory Regional Screening Level tables, May 2010
PPRTV = Provisional Peer Reviewed Toxicity Value
CA EPA = California Envirnomental Protection Agency

TABLE 5-14

CANCER TOXICITY DATA - INHALATION
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor(1)		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source	Date
Semivolatile Organic Compounds (2)							
BENZO(A)ANTHRACENE	1.1E-04	$(ug/m^3)^{-1}$	3.9E-01	$(mg/kg/day)^{-1}$	B2	CAEPA	4/2009
BENZO(A)PYRENE	1.1E-03	$(ug/m^3)^{-1}$	3.9E+00	$(mg/kg/day)^{-1}$	B2	CAEPA	4/2009
BENZO(B)FLUORANTHENE	1.1E-04	$(ug/m^3)^{-1}$	3.9E-01	$(mg/kg/day)^{-1}$	B2	CAEPA	4/2009
DIBENZO(A,H)ANTHRACENE	1.2E-03	$(ug/m^3)^{-1}$	4.1E+00	$(mg/kg/day)^{-1}$	B2	CAEPA	4/2009
INDENO(1,2,3-CD)PYRENE	1.1E-04	$(ug/m^3)^{-1}$	3.9E-01	$(mg/kg/day)^{-1}$	B2	CAEPA	4/2009
NAPHTHALENE	NA	NA	NA	NA	C	IRIS	9/1998
TCDD TEQs	3.8E+01	(ug/m^3)-1	1.3E+05	$(mg/kg/day)^{-1}$	B2	CA EPA (per ORNL)	NA
Pesticides/PCBs							
AROCLOR 1260	5.7E-04	(ug/m^3)-1	2.0E+00	$(mg/kg/day)^{-1}$	B2	IRIS	6/1997
Volatile Organic Compound							
BENZENE	7.8E-06	(ug/m3)-1	2.7E-02	(mg/kg/day)-1	A/Known human carcinogen	IRIS	1/2000
TETRACHLOROETHYLENE	5.9E-06	(ug/m3)-1	2.1E-02	$(mg/kg/day)^{-1}$	Not Classified	CA EPA (per ORNL)	NA
Inorganics							
ALUMINUM	NA	NA	NA	NA	NA	NA	NA
ARSENIC	4.3E-03	(ug/m^3)-1	1.5E+01	NA	A	IRIS	4/2009
BARIUM	NA	NA	NA	NA	NA	NA	NA
CADMIUM	1.8E-03	$(ug/m^3)^{-1}$	6.3E+00	NA	B1	IRIS	6/1992
CHROMIUM	1.2E-02	$(ug/m^3)^{-1}$	4.2E+01	NA	A/Known human carcinogen	IRIS	4/2009
COBALT	9.0E-03	$(ug/m^3)^{-1}$	3.2E+01	NA	NA	PPRTV (per ORNL)	9/12/2008
IRON	NA	NA	NA	NA	NA	NA	NA
MANGANESE	NA	NA	NA	NA	NA	NA	NA
MERCURY	NA	NA	NA	NA	C/Possible Human Carcinogen	IRIS	4/2009
VANADIUM	8.0E-03	$(ug/m^3)^{-1}$	2.8E+01	$(mg/kg/day)^{-1}$	NA	PPRTV (per ORNL)	NA

1 - Inhalation CSF = Unit Risk * 70 kg / 20m^3/day.

Definitions:
IRIS = Integrated Risk Information System.
HEAST= Health Effects Assessment Summary Tables
ORNL = Oak Ridge National Laboratory Regional Screening Level tables, May 2010
PPRTV = Provisional Peer Reviewed Toxicity Value
CA EPA = California Envirnomental Protection Agency

A - Human carcinogen.
B1 - Probable human carcinogen - indicates that limited human data are available.
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .
C - Possible human carcinogen.
D - Not classifiable as a human carcinogen.
E - Evidence of non-carcinogenicity.

TABLE 5-15

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Receptor	Medium	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and £ 1E-4	Chemicals with Cancer Risks > 1E-6 and £ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Construction/Excavation Worker	Surface Soil	Ingestion	2.E-06	- -	- -	cPAHs	1	- -
		Dermal Contact	8.E-07	- -	- -	- -	0.07	- -
		Inhalation	7.E-07	- -	- -	- -	12	Manganese
		Total	4.E-06	- -	- -	- -	13	Manganese
	Subsurface Soil	Ingestion	2.E-06	- -	- -	cPAHs	0.9	
		Dermal Contact	7.E-07	- -	- -	- -	0.04	
		Inhalation	3.E-07	- -	- -	- -	9	Manganese
		Total	3.E-06	- -	- -	- -	10	Manganese
	Groundwater	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	8.E-09	- -	- -	- -	0.4	- -
		Inhalation VOC	9.E-11	- -	- -	- -	0.0002	- -
		Total	8.E-09	- -	- -	- -	0.4	- -
		Total Surface Soil	4.E-06	- -	- -	cPAHs	13	Manganese
		Total Subsurface Soil	3.E-06	- -	- -	- -	10	Manganese
		Total Groundwater	8.E-09	- -	- -	- -	0.4	- -
		Total Across the Entire Site[1,2]	**4.E-06**	- -	- -	cPAHs	**12**	Manganese

Receptor	Medium	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and £ 1E-4	Chemicals with Cancer Risks > 1E-6 and £ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Occupational/Maintenance Worker	Surface Soil	Ingestion	5.E-05	- -	cPAHs, Arsenic	TCDD-TEQs	0.3	- -
		Dermal Contact	3.E-05	- -	cPAHs	Arsenic	0.034	- -
		Inhalation	0.E+00	- -	- -	- -	0.00001	- -
		Total	8.E-05	- -	- -	- -	0.3	- -
		Total Surface Soil	8.E-05	- -	cPAHs, Arsenic	TCDD-TEQs	0.3	- -
		Total Across the Entire Site	**8.E-05**	- -	cPAHs, Arsenic	TCDD-TEQs	**0.3**	- -

Receptor	Medium	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and £ 1E-4	Chemicals with Cancer Risks > 1E-6 and £ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Adolescent Trespasser	Surface Soil	Ingestion	8.E-06	- -	- -	cPAHs	0.05	- -
		Dermal Contact	6.E-06	- -	- -	cPAHs	0.006	- -
		Inhalation	0.E+00	- -	- -	- -	0.0000003	- -
		Total	1.E-05	- -	- -	- -	0.05	- -
		Total Surface Soil	1.E-05	- -	- -	cPAHs	0.05	- -
		Total Across the Entire Site	**1.E-05**	- -	- -	cPAHs	**0.05**	- -

TABLE 5-15

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Receptor	Medium	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and £ 1E-4	Chemicals with Cancer Risks > 1E-6 and £ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Future Child Resident	Surface Soil	Ingestion	2.E-03	cPAHs	Arsenic	Aroclor 1260, TCDD-TEQs	8	Arsenic, Iron
		Dermal Contact	8.E-04	cPAHs	- -	Arsenic	0.4	- -
		Inhalation	0.E+00	- -	- -	- -	0.0002	- -
		Total	3.E-03	cPAHs	Arsenic	Aroclor 1260, TCDD-TEQs	8	Arsenic, Iron
	Subsurface Soil	Ingestion	2.E-03	cPAHs, Arsenic	- -	- -	7	Arsenic, Cobalt, Iron
		Dermal Contact	6.E-04	cPAHs	Arsenic	- -	0.4	- -
		Total	2.E-03	cPAHs	Arsenic	- -	8	Arsenic, Cobalt, Iron
	Groundwater	Ingestion	1.E-04	- -	TCDD-TEQ, Pentachlorophenol, Arsenic	cPAHs, Tetrachloroethylene, Delta-BHC	23	Cobalt, Iron, Manganese
		Dermal Contact	1.E-06	- -	- -	- -	0.4	- -
		Inhalation - Showering	1.E-07	- -	- -	- -	0.005	- -
		Total	1.E-04	- -	TCDD-TEQ, Pentachlorophenol, Arsenic	cPAHs, Tetrachloroethylene, Delta-BHC	23	Cobalt, Iron, Manganese
		Total Surface Soil	3.E-03	cPAHs	Arsenic	Aroclor 1260, TCDD-TEQs	8	Arsenic, Iron
		Total Subsurface Soil	2.E-03	cPAHs, Arsenic			8	Arsenic, Cobalt, Iron
		Total Groundwater	1.E-04	- -	TCDD-TEQ, Pentachlorophenol, Arsenic	cPAHs, Tetrachloroethylene, Delta-BHC	23	Cobalt, Iron, Manganese
		Total Across the Entire Site[1,2]	**3.E-03**	cPAHs, Arsenic	TCDD-TEQ, Pentachlorophenol	Tetrachloroethylene, Delta-BHC	**31**	Arsenic, Cobalt, Iron, Manganese

Receptor	Medium	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and £ 1E-4	Chemicals with Cancer Risks > 1E-6 and £ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Future Adult Resident	Surface Soil	Ingestion	4.E-04	cPAHs	Arsenic	TCDD-TEQs	0.8	- -
		Dermal Contact	2.E-04	cPAHs	- -	Arsenic	0.062	- -
		Inhalation	0.E+00	- -	- -	- -	0.0002	- -
		Total	5.E-04	cPAHs	Arsenic	- -	0.9	- -
	Subsurface Soil	Ingestion	3.E-04	cPAHs	Arsenic		0.8	- -
		Dermal Contact	1.E-04	cPAHs	- -	Arsenic	0.07	- -
		Total	4.E-04	cPAHs	Arsenic		0.8	- -
	Groundwater	Ingestion	2.E-04	- -	TCDD-TEQ, Pentachlorophenol, Arsenic	cPAHs, Tetrachloroethylene, Delta-BHC	6.5	Cobalt, Iron, Manganese
		Dermal Contact	3.E-06	- -	- -	Tetrachloroethylene	0.3	- -
		Inhalation - Showering	1.E-07	- -	- -	- -	0.001	- -
		Total	2.E-04	- -	TCDD-TEQ, Pentachlorophenol, Arsenic	cPAHs, Tetrachloroethylene, Delta-BHC	7	Cobalt, Iron, Manganese
		Total Surface Soil	5.E-04	cPAHs	Arsenic	TCDD-TEQs	0.9	- -
		Total Subsurface Soil	4.E-04	cPAHs	Arsenic	- -	0.8	- -
		Total Groundwater	2.E-04	- -	TCDD-TEQ, Pentachlorophenol, Arsenic	cPAHs, Tetrachloroethylene, Delta-BHC	7	Cobalt, Iron, Manganese
		Total Across the Entire Site[1,2]	**7.E-04**	cPAHs	TCDD-TEQ, Pentachlorophenol, Arsenic	Tetrachloroethylene, Delta-BHC	8	Cobalt, Iron, Manganese
		Total Across the Entire Site Excluding Groundwater[3]	**5.E-04**	cPAHs	Arsenic	TCDD-TEQs	0.9	--

TABLE 5-15

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS
PAGE 3 OF 3

Receptor	Medium	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and £ 1E-4	Chemicals with Cancer Risks > 1E-6 and £ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Total Residential Risks	Surface Soil	Ingestion	3.E-03	cPAHs	Arsenic	TCDD-TEQs	NA	- -
		Dermal Contact	1.E-03	cPAHs	- -	Arsenic	NA	- -
		Inhalation	0.E+00	- -	- -	- -	NA	
		Total	4.E-03	cPAHs	Arsenic	Aroclor 1260, TCDD-TEQs	NA	- -
	Subsurface Soil	Ingestion	2.E-03	cPAHs	Arsenic	- -	NA	
		Dermal Contact	8.E-04	cPAHs	- -	- -	NA	
		Total	3.E-03	cPAHs, Arsenic	- -	- -	NA	
	Groundwater	Ingestion	3.E-04	- -	TCDD-TEQ, Pentachlorophenol, Arsenic	cPAHs, Tetrachloroethylene, Delta-BHC	NA	- -
		Dermal Contact	4.E-06	- -	- -	Tetrachloroethylene	NA	- -
		Inhalation - Showering	3.E-07	- -	- -	- -	NA	
		Total	3.E-04	- -	TCDD-TEQ, Pentachlorophenol, Arsenic	cPAHs, Tetrachloroethylene, Delta-BHC	NA	- -
Total Surface Soil			4.E-03	cPAHs	Arsenic	Aroclor 1260, TCDD-TEQs	NA	- -
Total Subsurface Soil			3.E-03	cPAHs, Arsenic	- -	- -	NA	
Total Groundwater			3.E-04	- -	TCDD-TEQ, Pentachlorophenol, Arsenic	cPAHs, Aroclor 1260, Tetrachloroethylene, Delta-BHC	NA	- -
Total Across the Entire Site[1,2]			**4.E-03**	cPAHs, Arsenic	TCDD-TEQ, Pentachlorophenol	Tetrachloroethylene, Delta-BHC	See Child-only summed HI	- -
Total Across the Entire Site Excluding Groundwater[3]			**3.E-03**	cPAHs, Arsenic	--	Aroclor 1260, TCDD-TEQs	See Child-only summed HI	- -

[1] Includes very conservative inclusion of groundwater exposure pathways for residential receptors. There is a municipal water supply, and a groundwater use restriction ordinance exists.

[2] Total Site Risks average the risk/hazards for surface and subsurface soil because the risk assessment assumes full default exposure factors for both surface and subsurface soil. To add surface and subsurface risks/hazards would double count soil pathway risks.

[3] Excludes groundwater exposure pathways from residential receptors because there are both a municipal water supply and a a gorundwater use restriction ordinance.

cPAHs = Carcinogenic PAHs

NA = Not applicable

TABLE 5-16

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Receptor	Medium	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Construction/Excavation Worker	Surface Soil	Ingestion	1.E-07	- -	- -	cPAHs	0.2	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.008	- -
		Inhalation	6.E-08	- -	- -	- -	1.47	Manganese
		Total	2.E-07	- -	- -	- -	2	Manganese
	Subsurface Soil	Ingestion	1.E-07	- -	- -	- -	0.2	
		Dermal Contact	2.E-08	- -	- -	- -	0.003	
		Inhalation	2.E-08	- -	- -	- -	1.6	Manganese
		Total	1.E-07	- -	- -	- -	2	Manganese
	Groundwater	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	5.E-09	- -	- -	- -	0.4	- -
		Inhalation VOC	- -[2]	- -	- -	- -	- -[1]	- -
		Total	5.E-09	- -	- -	- -	0.4	- -
		Total Surface Soil	2.E-07	- -	- -	- -	2	Manganese
		Total Subsurface Soil	1.E-07	- -	- -	- -	2	Manganese
		Total Groundwater	5.E-09	- -	- -	- -	0.4	- -
		Total Across the Entire Site[1,3]	**2.E-07**	- -	- -	- -	**2**	Manganese

Receptor	Medium	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Occupational/Maintenance Worker	Surface Soil	Ingestion	3.E-06	- -	- -	cPAHs, Arsenic	0.08	- -
		Dermal Contact	3.E-07	- -	- -	- -	0.002	- -
		Inhalation	0.E+00	- -	- -	- -	0.0000008	- -
		Total	3.E-06	- -	- -	- -	0.08	- -
		Total Surface Soil	3.E-06	- -	- -	cPAHs, Arsenic	0.08	- -
		Total Across the Entire Site[3]	**3.E-06**	- -	- -	cPAHs, Arsenic	**0.08**	- -

Receptor	Medium	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Adolescent Trespasser	Surface Soil	Ingestion	6.E-07	- -	- -	- -	0.008	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.0004	- -
		Inhalation	0.E+00	- -	- -	- -	0.00000002	- -
		Total	8.E-07	- -	- -	- -	0.008	- -
		Total Surface Soil	8.E-07	- -	- -	- -	0.008	- -
		Total Across the Entire Site[3]	**8.E-07**	- -	- -	- -	**0.008**	- -

TABLE 5-16

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Receptor	Medium	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Future Child Resident	Surface Soil	Ingestion	6.E-06	- -	- -	cPAHs, Arsenic	0.8	- -
		Dermal Contact	6.E-07	- -	- -	- -	0.016	- -
		Inhalation	0.E+00	- -	- -	- -	0.000009	- -
		Total	7.E-06	- -	- -	cPAHs, Arsenic	0.8	- -
	Subsurface Soil	Ingestion	4.E-06	- -	- -	cPAHs, Arsenic	0.6	- -
		Dermal Contact	4.E-07	- -	- -	- -	0.009	- -
		Total	5.E-06	- -	- -	cPAHs, Arsenic	0.6	- -
	Groundwater	Ingestion	1.E-05	- -	- -	TCDD-TEQ, Pentachlorophenol, Arsenic	10	Manganese
		Dermal Contact	2.E-07	- -	- -	- -	0.4	- -
		Inhalation - Showering	3.E-08	- -	- -	- -	0.003	- -
		Total	1.E-05	- -	- -	TCDD-TEQ, Pentachlorophenol, Arsenic	10	Cobalt, Iron, Manganese
		Total Surface Soil	7.E-06	- -	- -	cPAHs, Arsenic	0.8	- -
		Total Subsurface Soil	5.E-06	- -	- -	cPAHs, Arsenic	0.6	- -
		Total Groundwater	1.E-05	- -	- -	TCDD-TEQ, Pentachlorophenol, Arsenic	10	Cobalt, Iron, Manganese
		Total Across the Entire Site[1,3]	**2.E-05**	- -	- -	cPAHs, TCDD-TEQ, Pentachlorophenol, Arsenic	**11**	Cobalt, Iron, Manganese
		Total Across the Entire Site Excluding Groundwater[4]	**6.E-06**	- -	- -	cPAHs, Arsenic	**0.7**	- -
Receptor	**Medium**	**Exposure Route**	**Cancer Risk**	**Chemicals with Cancer Risks > 1E-4**	**Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4**	**Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5**	**Hazard Index (HI)**	**Chemicals with HI > 1**
Future Adult Resident	Surface Soil	Ingestion	2.E-06	- -	- -	cPAHs	0.08	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.002	- -
		Inhalation	0.E+00	- -	- -	- -	0.000009	- -
		Total	3.E-06	- -	- -	cPAHs	0.08	- -
	Subsurface Soil	Ingestion	2.E-06	- -	- -	- -	0.07	- -
		Dermal Contact	1.E-07	- -	- -	- -	0.001	- -
		Total	2.E-06	- -	- -	- -	0.07	- -
	Groundwater	Ingestion	2.E-05	- -	TCDD-TEQ, Pentachlorophenol	cPAHs, Tetrachloroethylene, Delta-BHC	4.45	Manganese
		Dermal Contact	4.E-07	- -	- -	Pentachlorophenol	0.2	- -
		Inhalation - Showering	1.E-08	- -	- -	- -	0.0004	- -
		Total	2.E-05	- -	TCDD-TEQ, Pentachlorophenol, Arsenic	cPAHs, Tetrachloroethylene, Delta-BHC	5	Manganese
		Total Surface Soil	3.E-06	- -	Arsenic	TCDD-TEQs	0.08	- -
		Total Subsurface Soil	2.E-06	- -	Arsenic	- -	0.07	- -
		Total Groundwater	2.E-05	- -	TCDD-TEQ, Pentachlorophenol	cPAHs, Tetrachloroethylene, Delta-BHC	5	Manganese
		Total Across the Entire Site[1,3]	**2.E-05**	- -	TCDD-TEQ, Pentachlorophenol, Arsenic	cPAHs, Tetrachloroethylene, Delta-BHC	**5**	Manganese
		Total Across the Entire Site Excluding Groundwater[4]	**2.E-06**	- -	- -	cPAHs	0.08	- -

TABLE 5-16

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Receptor	Medium	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index (HI)	Chemicals with HI > 1
Total Residential Risks	Surface Soil	Ingestion	8.E-06	- -	- -	cPAHs, Arsenic	NA	- -
		Dermal Contact	8.E-07	- -	- -	- -	NA	- -
		Inhalation	0.E+00	- -	- -	- -	NA	
		Total	9.E-06	- -	- -	cPAHs, Arsenic	NA	- -
	Subsurface Soil	Ingestion	6.E-06	- -	- -	cPAHs, Arsenic	NA	
		Dermal Contact	5.E-07	- -	- -	- -	NA	
		Total	7.E-06	- -	- -	cPAHs, Arsenic	NA	
	Groundwater	Ingestion	4.E-05	- -	TCDD-TEQ, Pentachlorophenol	cPAHs, Tetrachloroethylene, Delta-BHC	NA	- -
		Dermal Contact	7.E-07	- -	- -	- -	NA	- -
		Inhalation - Showering	4.E-08	- -	- -	- -	NA	
		Total	4.E-05	- -	TCDD-TEQ, Pentachlorophenol	cPAHs, Tetrachloroethylene, Delta-BHC	NA	- -
		Total Surface Soil	9.E-06	- -	- -	cPAHs, Arsenic	NA	- -
		Total Surbsurface Soil	7.E-06	- -	- -	- -	NA	
		Total Groundwater	4.E-05	- -	TCDD-TEQ, Pentachlorophenol	cPAHs, Tetrachloroethylene, Delta-BHC	NA	- -
		Total Across the Entire Site[1,3]	**4.E-05**	- -	TCDD-TEQ, Pentachlorophenol	cPAHs, Arsenic, Tetrachloroethylene, Delta-BHC	See Child-only summed HI	- -
		Total Across the Entire Site Excluding Groundwater[4]	**8.E-06**	- -	- -	cPAHs, Arsenic	See Child-only summed HI	- -

[1] Includes very conservative inclusion of groundwater exposure pathways for residential receptors. There is a municipal water supply, and a groundwater use restriction ordinance exists.

[2] Not calculated for CTE because RME risk/HI insignificant for this pathway.

[3] Total Site Risks average the risk/hazards for surface and subsurface soil because the risk assessment assumes full default exposure factors for both surface and subsurface soil. To add surface and subsurface risks/hazards would double count soil pathway risks.

[4] Excludes groundwater exposure pathways from residential receptors because there are both a municipal water supply and a a gorundwater use restriction ordinance.

cPAHs = Carcinogenic PAHs NA = Not applicable

TABLE 5-17A

HUMAN HEALTH SURFACE SOIL MIGRATION TO GROUNDWATER SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS #	Minimum Result(1)	Maximum Result(1)(2)	Average Positive Result	Overall Average	TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)(3)	NON-TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)(4)	ORNL Risk Based SSL - Migration from Soil to Groundwater(5)	ORNL MCL Based SSL - Migration from Soil to Groundwater(5)
Volatile Organics (ug/kg)									
2-BUTANONE	78-93-3	14.0	14.0	14.0	5.5	NC	NC	1500	NC
ACETONE	67-64-1	21.0	180.0 J	75.8	22.8	25000	NC	4500	NC
BENZENE	71-43-2	0.6 J	1.1 J	0.8	2.3	30	NC	0.21	2.6
CARBON DISULFIDE	75-15-0	1.6 J	16.0	4.9	4.1	32000	NC	310	NC
CYCLOHEXANE	110-82-7	0.7 J	2.9 J	1.4	2.0	NC	NC	13000	NC
ETHYLBENZENE	100-41-4	0.9 J	0.9 J	0.9	2.7	13000	NC	1.7	780
METHYL CYCLOHEXANE	108-87-2	0.4 J	3.7 J	1.8	1.9	NC	NC	NC	NC
TETRACHLOROETHENE	127-18-4	1.4 J	1.4 J	1.4	2.7	60	NC	0.049	2.3
TOLUENE	108-88-3	1.1 J	1.4 J	1.3	2.7	12000	NC	1600	690
TOTAL XYLENES	1330-20-7	1.6 J	1.6 J	1.6	2.7	150000	NC	200	9800
Semivolatile Organics/PAHs (ug/kg)									
1,1-BIPHENYL	92-52-4	62.0 J	62 J	62.0	182.8	NC	150000	19000	NC
2-METHYLNAPHTHALENE	91-57-6	27.0	900	415.9	415.9	NC	NC	750	NC
4-METHYLPHENOL	106-44-5	50.0 J	50 J	50.0	183.6	NC	200	150	NC
ACENAPHTHENE	83-32-9	13.0	2200	304.4	235.6	570000	NC	22000	NC
ACENAPHTHYLENE	208-96-8	20.0	680	124.9	57.8	NC	85000	22000	NC
ACETOPHENONE	98-86-2	48.0 J	48 J	48.0	183.1	NC	NC	1100	NC
ANTHRACENE	120-12-7	37.0	7200	917.6	584.6	12000000	NC	360000	NC
BAP EQUIVALENT-FULLND	NA	9.9	50631	3566.0	3566.0	NC	NC	3.5	240
BENZO(A)ANTHRACENE	56-55-3	110.0	22000 J	1894.0	1722.0	2000	NC	10	NC
BENZO(A)PYRENE	50-32-8	200.0	38000 J	3333.5	2576.4	8000	NC	3.5	240
BENZO(B)FLUORANTHENE	205-99-2	290.0	59000 J	4382.5	3984.3	5000	NC	35	NC
BENZO(G,H,I)PERYLENE	191-24-2	150.0	24000 J	1943.9	1590.8	NC	27000000	120000	NC
BENZO(K)FLUORANTHENE	207-08-9	110.0	21000 J	1735.5	1577.9	49000	NC	350	NC
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	51.0 J	3400 J	354.8	312.3	3600000	NC	1100	1400
BUTYL BENZYL PHTHALATE	85-68-7	97.0 J	97 J	97.0	185.3	930000	NC	510	NC
CARBAZOLE	86-74-8	66.0 J	2400	1086.5	509.1	600	NC	NC	NC
CHRYSENE	218-01-9	130.0 J	31000 J	2491.0	2264.7	160000	NC	1100	NC
DI-N-BUTYL PHTHALATE	84-74-2	37.0 J	190 J	113.5	182.8	2300000	NC	9200	NC
DIBENZO(A,H)ANTHRACENE	53-70-3	44.0	1100	325.7	178.5	2000	NC	11	NC
DIBENZOFURAN	132-64-9	39.0 J	640	222.2	222.2	NC	NC	680	NC
FLUORANTHENE	206-44-0	260.0	84000	6079.5	6079.5	4300000	NC	160000	NC
FLUORENE	86-73-7	11.0	1600	462.0	190.1	560000	NC	27000	NC
INDENO(1,2,3-CD)PYRENE	193-39-5	150.0	36000 J	3038.8	2210.5	14000	NC	120	NC
NAPHTHALENE	91-20-3	18.0	520	237.0	237.0	12000	NC	0.47	NC
PHENANTHRENE	85-01-8	250.0	30000	3104.5	3104.5	NC	200000	120000	NC
PYRENE	129-00-0	240.0	70000	5049.1	5049.1	4200000	NC	120000	NC
TOTAL PAHS-FULLND	NA	2508.0	427249	32065.7	32065.7	NC	NC	NC	NC
Pesticides/PCBs (ug/kg)									
4,4'-DDD	72-54-8	0.8 J	520.0 J	100.6	100.6	16000	NC	66	NC
4,4'-DDE	72-55-9	0.5 J	350.0 J	55.5	55.5	54000	NC	47	NC
4,4'-DDT	50-29-3	0.8 J	740.0 J	81.4	81.4	32000	NC	67	NC

TABLE 5-17A

HUMAN HEALTH SURFACE SOIL MIGRATION TO GROUNDWATER SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS #	Minimum Result(1)	Maximum Result(1)(2)	Average Positive Result	Overall Average	TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)(3)	NON-TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)(4)	ORNL Risk Based SSL - Migration from Soil to Groundwater(5)	ORNL MCL Based SSL - Migration from Soil to Groundwater(5)
Pesticides/PCBs (ug/kg)									
ALDRIN	309-00-2	0.2 J	0.3 J	0.3	0.2	500	NC	0.65	NC
ALPHA-BHC	319-84-6	0.3 J	12.0 J	3.9	1.4	0.5	NC	0.062	NC
ALPHA-CHLORDANE	5103-71-9	0.6 J	27.0 J	5.6	3.1	NC	NC	13	140
AROCLOR-1260	11096-82-5	21.0 J	720.0 J	229.9	149.9	NC	NC	24	NC
BETA-BHC	319-85-7	0.3 J	1.0 J	0.6	0.2	NC	NC	0.22	NC
DELTA-BHC	319-86-8	0.4 J	3.5 J	1.3	0.6	NC	NC	0.062	NC
DIELDRIN	60-57-1	0.3 J	15.0 J	4.8	3.4	4	NC	0.17	NC
ENDOSULFAN I	959-98-8	0.2 J	14.0 J	3.9	1.4	NC	NC	3000	NC
ENDOSULFAN II	33213-65-9	0.6 J	4.6 J	2.3	0.9	NC	NC	3000	NC
ENDOSULFAN SULFATE	1031-07-8	1.0 J	25.0 J	6.9	3.9	NC	NC	3000	NC
ENDRIN	72-20-8	0.7 J	224.0	39.4	14.6	1000	NC	440	81
ENDRIN ALDEHYDE	7421-93-4	0.4 J	28.0 J	7.9	2.4	NC	NC	440	81
ENDRIN + ENDRIN ALDEHYDE	NA	1.1 J	252.0 J	47.3	17.0	1000	NC	NC	NC
ENDRIN KETONE	53494-70-5	0.9 J	44.0 J	12.4	2.6	NC	NC	440	81
GAMMA-BHC (LINDANE)	58-89-9	0.2 J	20.0	3.1	1.4	9	NC	0.36	1.2
GAMMA-CHLORDANE	5103-74-2	0.6 J	189.0 J	19.6	16.9	NC	NC	13	140
ALPHA + GAMMA CHLORDANE	NA	1.3 J	216.0 J	25.1	20.1	10000	NC	NC	NC
HEPTACHLOR EPOXIDE	1024-57-3	0.2 J	3.0	1.3	0.8	700	NC	0.15	4.1
METHOXYCHLOR	72-43-5	0.4 J	37.0 J	8.5	5.9	160000	NC	9900	2200
Dioxins/Furans (ng/kg)									
1,2,3,4,6,7,8,9-OCDD	3268-87-9	174.0	1310.0	742.0	742.0	NC	NC	870	NC
1,2,3,4,6,7,8,9-OCDF	39001-02-0	19.8	141.0	80.4	80.4	NC	NC	870	NC
1,2,3,4,6,7,8-HPCDD	35822-46-9	17.7	169.0	93.4	93.4	NC	NC	26	NC
1,2,3,4,6,7,8-HPCDF	67562-39-4	9.6	82.4	46.0	46.0	NC	NC	26	NC
1,2,3,4,7,8,9-HPCDF	55673-89-7	1.0 J	4.1 J	2.5	2.5	NC	NC	26	NC
1,2,3,4,7,8-HXCDD	39227-28-6	1.9 J	1.9 J	1.9	2.2	NC	NC	2.6	NC
1,2,3,4,7,8-HXCDF	70648-26-9	1.3 J	5.9	3.6	3.6	NC	NC	2.6	NC
1,2,3,6,7,8-HXCDD	57653-85-7	1.1 J	7.9	4.5	4.5	NC	NC	2.6	NC
1,2,3,6,7,8-HXCDF	57117-44-9	1.1 J	11.6	6.3	6.3	NC	NC	2.6	NC
1,2,3,7,8,9-HXCDD	19408-74-3	0.8 J	5.2	3.0	3.0	NC	NC	2.6	NC
1,2,3,7,8,9-HXCDF	72918-21-9	0.4 J	2.7 J	1.5	1.5	NC	NC	2.6	NC
1,2,3,7,8-PECDD	40321-76-4	0.8 J	5.9 J	3.3	3.3	NC	NC	0.26	NC
1,2,3,7,8-PECDF	57117-41-6	1.9 J	1.9 J	1.9	1.1	NC	NC	8.7	NC
2,3,4,6,7,8-HXCDF	60851-34-5	1.8 J	26.2	14.0	14.0	NC	NC	2.6	NC
2,3,4,7,8-PECDF	57117-31-4	3.7 J	57.5	30.6	30.6	NC	NC	0.87	NC
2,3,7,8-TCDD	1746-01-6	0.2 J	0.8 J	0.5	0.5	NC	NC	0.26	15
2,3,7,8-TCDF	51207-31-9	3.2	3.2	3.2	1.8	NC	NC	2.6	NC
TEQ FULLND	CALC066	3.6	33.5	18.6	18.6	NC	NC	0.26	NC
TOTAL HPCDD	37871-00-4	33.9	326.0	180.0	180.0	NC	NC	NC	NC
TOTAL HPCDF	38998-75-3	25.2	202.0	113.6	113.6	NC	NC	NC	NC
TOTAL HXCDD	34465-46-8	10.6	67.0	38.8	38.8	NC	NC	NC	NC
TOTAL HXCDF	55684-94-1	29.8 J	393.0 J	211.4	211.4	NC	NC	NC	NC

TABLE 5-17A

HUMAN HEALTH SURFACE SOIL MIGRATION TO GROUNDWATER SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS #	Minimum Result[1]	Maximum Result[1][2]	Average Positive Result	Overall Average	TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[3]	NON-TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[4]	ORNL Risk Based SSL - Migration from Soil to Groundwater[5]	ORNL MCL Based SSL - Migration from Soil to Groundwater[5]
Dioxins/Furans (ng/kg)									
TOTAL PECDD	36088-22-9	4.0 J	19.4 J	11.7	11.7	NC	NC	NC	NC
TOTAL PECDF	30402-15-4	40.9	712.0 J	376.5	376.5	NC	NC	NC	NC
TOTAL TCDD	41903-57-5	1.6	10.8	6.2	6.2	NC	NC	NC	NC
TOTAL TCDF	55722-27-5	16.2	215.0 J	115.6	115.6	NC	NC	NC	NC
Herbicides (ug/kg)									
2,4-D	94-75-7	217.0 J	217.0 J	217.0	36.9	1500	NC	95	18
DICAMBA	1918-00-9	4.9 J	10.0 J	7.2	4.2	NC	NC	280	NC
DINOSEB	88-85-7	17.2 J	17.2 J	17.2	14.3	340	NC	320	62
Inorganics (mg/kg)									
ALUMINUM	7429-90-5	2470.0	29500.0	7623.2	7623.2	NC	3.5	55000	NC
ANTIMONY	7440-36-0	0.6 J	5.2	2.2	1.0	0.006	NC	0.66	0.27
ARSENIC	7440-38-2	3.1	48.4 J	12.5	12.5	0.05	NC	0.0013	0.29
BARIUM	7440-39-3	29.3 J	234.0 J	76.4	76.4	2	NC	300	82
BERYLLIUM	7440-41-7	0.3	4.7 J	1.0	1.0	0.004	NC	58	3.2
CADMIUM	7440-43-9	0.1	13.0	2.3	2.2	0.005	NC	1.4	0.38
CALCIUM	7440-70-2	2240.0 J	133000.0	71560.9	71560.9	NC	NC	NC	NC
CHROMIUM	7440-47-3	5.4 J	163.0 J	20.3	20.3	0.1	NC	NC	180000
COBALT	7440-48-4	2.3	17.7	6.6	6.6	1	NC	0.49	NC
COPPER	7440-50-8	12.9	835.0	93.6	93.6	0.65	NC	51	46
IRON	7439-89-6	6660.0 J	69500.0 J	26761.8	26761.8	5	5	640	NC
LEAD	7439-92-1	16.7	428.0	101.0	101.0	0.0075	NC	NC	14
MAGNESIUM	7439-95-4	1440.0	75800.0	34817.3	34817.3	NC	NC	NC	NC
MANGANESE	7439-96-5	173.0	2420.0 J	588.6	588.6	0.15	NC	57	NC
MERCURY	7439-97-6	0.0	9.0	0.6	0.6	0.002	NC	0.03	0.1
NICKEL	7440-02-0	5.6	56.2 J	21.9	21.9	0.1	NC	48	NC
POTASSIUM	7440-09-7	428.0	1930.0	839.4	839.4	NC	NC	NC	NC
SILVER	7440-22-4	0.2	1.4	0.7	0.2	0.05	NC	1.6	NC
SODIUM	7440-23-5	230.0	2080.0	926.9	926.9	NC	NC	NC	NC
VANADIUM	7440-62-2	8.9	25.7	16.7	16.7	0.049	NC	180	NC
ZINC	7440-66-6	46.5	1230.0	246.8	246.8	5	NC	680	NC

Associated Samples:
NTC21SB01-SO-0102
NTC21SB02-SO-0001
NTC21SB03-SO-0001
NTC21SB04-SO-0001
NTC21SB05-SO-0001
NTC21SB06-SO-0001
NTC21SB07-SO-0001
NTC21SB08-SO-0001
NTC21SB09-SO-0001
NTC21SB10-SO-0001
NTC21SB21-SO-0001
NTC21SB22-SO-0001

Notes:
1 - Duplicate analytical results are not be used for the EPC calculations. Data values less than sample-specific detection limits are reported as the detection limit.
2 - The maximum detected concentration is used for screening purposes
3 - Section 742 Table A, Tier 1 Soil Remediation Objectives for Residential Properties (online, 2010).
4 - Soil Remediation Objectives for Residential Properties, Non-TACO Chemicals (2010)
5 - USEPA ORNL Soil Screening Level for the Potection of Groundwater (USEPA, 2008)
Values are for hexavalent chromium.
Acenaphthene is used as a surrogate for acenaphthylene
Pyrene is used as a surrogate for benzo(ghi)perylene and phenanthrene
Nickel criteria based on nickle soluble salts
BAP equivalent criteria based on BaP
Illinois EPA TACO criteria for chlordane used as a surrogate for alpha- and gamma-chlordane
Illinois EPA TACO criteria for endosulfan used as a surrogate for endosulfan I
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

Definitions:
J = Estimated value
NC = No criteria

TABLE 5-17B

HUMAN HEALTH SUBSURFACE SOIL MIGRATION TO GROUNDWATER SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS #	Minimum Result(1)	Maximum Result(1)(2)	Average Positive Result	Overall Average	TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)(3)	NON-TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)(4)	ORNL Risk Based SSL - Migration from Soil to Groundwater(5)	ORNL MCL Based SSL - Migration from Soil to Groundwater(5)
Volatile Organics (ug/kg)									
2-BUTANONE	78-93-3	9.0 J	28.0 J	14.2	5.2	NC	NC	1500	NC
ACETONE	67-64-1	25.0 J	87.0	56.8	15.0	25000	NC	4500	NC
BENZENE	71-43-2	0.4 J	4.8	1.8	2.3	30	NC	**0.21**	**2.6**
CARBON DISULFIDE	75-15-0	1.2 J	12.0	4.5	3.7	32000	NC	310	NC
CHLOROMETHANE	74-87-3	1.0 J	2.2 J	1.6	4.8	NC	NC	49	NC
CIS-1,2-DICHLOROETHENE	156-59-2	1.5 J	1.5 J	1.5	4.9	400	NC	110	21
CYCLOHEXANE	110-82-7	0.6 J	9.0	2.4	2.4	NC	NC	13000	NC
ETHYLBENZENE	100-41-4	0.7 J	1.9 J	1.2	2.3	13000	NC	**1.7**	780
ISOPROPYLBENZENE	98-82-8	1.0 J	1.0 J	1.0	2.5	NC	NC	1100	NC
METHYL CYCLOHEXANE	108-87-2	1.2 J	11.0	3.9	3.7	NC	NC	NC	NC
TETRACHLOROETHENE	127-18-4	3.3 J	18.0	10.7	3.4	60	NC	**0.049**	**2.3**
TOLUENE	108-88-3	1.4 J	5.6	3.0	2.9	12000	NC	1600	690
TOTAL XYLENES	1330-20-7	2.2 J	2.2 J	2.2	2.6	150000	NC	200	9800
TRICHLOROFLUOROMETHANE	75-69-4	1.4 J	2.8 J	2.3	2.6	NC	NC	830	NC
TRICHLOROFLUOROMETHANE	75-69-4	1.4 J	2.8 J	2.3	2.6	NC	NC	830	NC
Semivolatile Organics/PAHs (ug/kg)									
1,1-BIPHENYL	92-52-4	96.0 J	96 J	96.0	192.2	NC	150000	19000	NC
2-METHYLNAPHTHALENE	91-57-6	2.4 J	2100	348.5	254.1	NC	NC	**750**	NC
ACENAPHTHENE	83-32-9	12.0	880	165.8	91.4	570000	NC	22000	NC
ACENAPHTHYLENE	208-96-8	2.8 J	2000	223.0	112.5	NC	85000	22000	NC
ACETOPHENONE	98-86-2	230.0 J	230 J	230.0	198.8	NC	NC	1100	NC
ANTHRACENE	120-12-7	2.9 J	5000	697.5	349.8	12000000	NC	360000	NC
BAP EQUIVALENT-FULLND	NA	8.4	39374	2316.8	2316.8	NC	NC	**3.5**	**240**
BENZALDEHYDE	100-52-7	220.0 J	220 J	220.0	185.5	NC	3300	810	NC
BENZO(A)ANTHRACENE	56-55-3	2.5 J	32000	2140.3	1848.7	**2000**	NC	**10**	NC
BENZO(A)PYRENE	50-32-8	12.0	27000	2701.9	1597.5	**8000**	NC	**3.5**	**240**
BENZO(B)FLUORANTHENE	205-99-2	6.4	41000	3090.4	2388.5	**5000**	NC	**35**	NC
BENZO(G,H,I)PERYLENE	191-24-2	4.1	11000	973.0	708.2	NC	27000000	120000	NC
BENZO(K)FLUORANTHENE	207-08-9	7.2	14000	1135.9	878.2	49000	NC	**350**	NC
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	54.0 J	280 J	170.4	196.3	3600000	NC	1100	1400
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	54.0 J	280 J	170.4	196.3	3600000	NC	1100	1400
BUTYL BENZYL PHTHALATE	85-68-7	110.0 J	110 J	110.0	200.9	930000	NC	510	NC
CARBAZOLE	86-74-8	430.0 J	1000	715.0	439.8	**600**	NC	NC	NC
CHRYSENE	218-01-9	3.4 J	34000	2091.1	1996.1	160000	NC	**1100**	NC
DIBENZO(A,H)ANTHRACENE	53-70-3	2.4 J	3300	440.9	181.6	**2000**	NC	**11**	NC
DIBENZOFURAN	132-64-9	34.0 J	670	209.6	208.9	NC	NC	680	NC
FLUORANTHENE	206-44-0	6.8	56000	4247.6	3668.6	4300000	NC	160000	NC
FLUORENE	86-73-7	2.5 J	1200	253.9	72.7	560000	NC	27000	NC
INDENO(1,2,3-CD)PYRENE	193-39-5	12.0	16000	1706.9	1009.5	**14000**	NC	**120**	NC
NAPHTHALENE	91-20-3	3.8 J	4600	593.8	432.4	12000	NC	**0.47**	NC
PHENANTHRENE	85-01-8	1.8 J	11000	1498.3	1430.3	NC	200000	120000	NC
PHENANTHRENE	85-01-8	1.8 J	11000	1498.3	1430.3	NC	200000	120000	NC
PYRENE	129-00-0	6.9	52000	3730.6	3222.2	4200000	NC	120000	NC
TOTAL PAHS-FULLND	NA	61.1	308070	20255.1	20255.1	NC	NC	NC	NC

TABLE 5-17B

HUMAN HEALTH SUBSURFACE SOIL MIGRATION TO GROUNDWATER SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS #	Minimum Result[1]	Maximum Result[1][2]	Average Positive Result	Overall Average	TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[3]	NON-TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)[4]	ORNL Risk Based SSL - Migration from Soil to Groundwater[5]	ORNL MCL Based SSL - Migration from Soil to Groundwater[5]
Pesticides/PCBs (ug/kg)									
4,4'-DDD	72-54-8	0.4 J	480.0	120.2	49.4	16000	NC	66	NC
4,4'-DDE	72-55-9	0.7 J	300.0	57.0	26.1	54000	NC	47	NC
4,4'-DDT	50-29-3	1.2 J	240.0 J	40.1	18.4	32000	NC	67	NC
ALDRIN	309-00-2	0.8 J	0.8 J	0.8	0.2	500	NC	0.65	NC
ALPHA-BHC	319-84-6	0.3 J	2.8 J	0.9	0.4	0.5	NC	0.062	NC
ALPHA-CHLORDANE	5103-71-9	0.4 J	26.0 J	8.1	2.7	NC	NC	13	140
AROCLOR-1242	53469-21-9	47.0 J	47.0 J	47.0	12.1	NC	NC	5.3	NC
AROCLOR-1260	11096-82-5	29.0 J	440.0 J	156.5	63.7	NC	NC	24	NC
BETA-BHC	319-85-7	0.6 J	1.1 J	0.8	0.3	NC	NC	0.22	NC
DELTA-BHC	319-86-8	0.3 J	3.0	1.1	0.4	NC	NC	0.062	NC
DIELDRIN	60-57-1	0.9 J	5.6 J	2.3	1.1	4	NC	0.17	NC
ENDOSULFAN I	959-98-8	0.3 J	3.2 J	1.4	0.4	NC	NC	3000	NC
ENDOSULFAN II	33213-65-9	0.2 J	1.3	0.8	0.5	NC	NC	3000	NC
ENDOSULFAN SULFATE	1031-07-8	0.7 J	8.7 J	3.1	1.4	NC	NC	3000	NC
ENDRIN	72-20-8	0.8 J	3.2 J	1.7	0.7	1000	NC	440	81
ENDRIN ALDEHYDE	7421-93-4	1.1 J	4.9 J	3.0	0.6	NC	NC	440	81
ENDRIN + ENDRIN ALDEHYDE	NA	1.9 J	8.1 J	4.7	1.4	1000	NC	NC	NC
ENDRIN KETONE	53494-70-5	1.5 J	1.5 J	1.5	0.5	NC	NC	440	81
GAMMA-BHC (LINDANE)	58-89-9	0.3 J	2.3 J	0.9	0.3	9	NC	0.36	1.2
GAMMA-CHLORDANE	5103-74-2	0.2 J	46.0 J	7.3	4.1	NC	NC	13	140
ALPHA + GAMMA CHLORDANE	NA	0.6 J	72.0 J	15.4	6.8	10000	NC	NC	NC
HEPTACHLOR EPOXIDE	1024-57-3	0.3 J	6.9 J	2.4	0.9	700	NC	0.15	4.1
METHOXYCHLOR	72-43-5	0.8 J	34.2 J	7.0	3.3	160000	NC	9900	2200
Dioxins/Furans (ng/kg)									
1,2,3,4,6,7,8,9-OCDD	3268-87-9	1950.0	1950.0	1950.0	1950.0	NC	NC	870	NC
1,2,3,4,6,7,8,9-OCDF	39001-02-0	44.8	44.8	44.8	44.8	NC	NC	870	NC
1,2,3,4,6,7,8-HPCDD	35822-46-9	167.0	167.0	167.0	167.0	NC	NC	26	NC
1,2,3,4,6,7,8-HPCDF	67562-39-4	18.1	18.1	18.1	18.1	NC	NC	26	NC
1,2,3,4,7,8,9-HPCDF	55673-89-7	1.7 J	1.7 J	1.7	1.7	NC	NC	26	NC
1,2,3,4,7,8-HXCDD	39227-28-6	1.0 J	1.0 J	1.0	1.0	NC	NC	2.6	NC
1,2,3,4,7,8-HXCDF	70648-26-9	2.6 J	2.6 J	2.6	2.6	NC	NC	2.6	NC
1,2,3,6,7,8-HXCDD	57653-85-7	3.6 J	3.6 J	3.6	3.6	NC	NC	2.6	NC
1,2,3,6,7,8-HXCDF	57117-44-9	1.4 J	1.4 J	1.4	1.4	NC	NC	2.6	NC
1,2,3,7,8,9-HXCDD	19408-74-3	2.4 J	2.4 J	2.4	2.4	NC	NC	2.6	NC
1,2,3,7,8,9-HXCDF	72918-21-9	0.7 J	0.7 J	0.7	0.7	NC	NC	2.6	NC
1,2,3,7,8-PECDD	40321-76-4	0.6 J	0.6 J	0.6	0.6	NC	NC	0.26	NC
2,3,4,6,7,8-HXCDF	60851-34-5	2.1 J	2.1 J	2.1	2.1	NC	NC	2.6	NC
2,3,4,7,8-PECDF	57117-31-4	2.8 J	2.8 J	2.8	2.8	NC	NC	0.87	NC
2,3,7,8-TCDD	1746-01-6	0.3 J	0.3 J	0.3	0.3	NC	NC	0.26	15
TEQ FULLND	NA	5.6	5.6	5.6	5.6	NC	NC	0.26	NC
TOTAL HPCDD	37871-00-4	335.0	335.0	335.0	335.0	NC	NC	NC	NC
TOTAL HPCDF	38998-75-3	61.3	61.3	61.3	61.3	NC	NC	NC	NC
TOTAL HXCDD	34465-46-8	29.8	29.8	29.8	29.8	NC	NC	NC	NC
TOTAL HXCDF	55684-94-1	40.4	40.4	40.4	40.4	NC	NC	NC	NC
TOTAL PECDD	36088-22-9	4.8 J	4.8 J	4.8	4.8	NC	NC	NC	NC
TOTAL PECDF	30402-15-4	32.5	32.5	32.5	32.5	NC	NC	NC	NC
TOTAL TCDD	41903-57-5	2.9	2.9	2.9	2.9	NC	NC	NC	NC
TOTAL TCDF	55722-27-5	12.6	12.6	12.6	12.6	NC	NC	NC	NC

TABLE 5-17B

HUMAN HEALTH SUBSURFACE SOIL MIGRATION TO GROUNDWATER SCREENING ASSESSMENT
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

Parameter	CAS #	Minimum Result(1)	Maximum Result(1)(2)	Average Positive Result	Overall Average	TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)(3)	NON-TACO Migration to Groundwater - Class 1 (Soil Component of the Groundwater Ingestion Route)(4)	ORNL Risk Based SSL - Migration from Soil to Groundwater(5)	ORNL MCL Based SSL - Migration from Soil to Groundwater(5)
Herbicides (ug/kg)									
2,4-D	94-75-7	54.6 J	54.6 J	54.6	31.0	1500	NC	95	18
DICAMBA	1918-00-9	6.1 J	29.2 J	11.5	4.9	NC	NC	280	NC
Inorganics (mg/kg)									
ALUMINUM	7429-90-5	3720.0	24300.0	9343.2	9343.2	NC	3.5	55000	NC
ANTIMONY	7440-36-0	0.6	0.6	0.6	0.4	0.006	NC	0.66	0.27
ARSENIC	7440-38-2	4.2	85.0 J	12.1	12.1	0.05	NC	0.0013	0.29
BARIUM	7440-39-3	12.4 J	157.0 J	69.3	69.3	2	NC	300	82
BERYLLIUM	7440-41-7	0.2	4.1	1.0	1.0	0.004	NC	58	3.2
CADMIUM	7440-43-9	0.1	9.6	1.3	1.2	0.005	NC	1.4	0.38
CALCIUM	7440-70-2	4280.0 J	177000.0	54851.8	54851.8	NC	NC	NC	NC
CHROMIUM	7440-47-3	7.9	34.3 J	15.1	15.1	0.1	NC	NC	180000
COBALT	7440-48-4	2.3	23.8	8.9	8.9	1	NC	0.49	NC
COPPER	7440-50-8	9.9	124.0 J	47.6	47.6	0.65	NC	51	46
IRON	7439-89-6	6560.0	65800.0 J	26966.4	26966.4	5	5	640	NC
LEAD	7439-92-1	8.9	228.0 J	54.5	54.5	0.0075	NC	NC	14
MAGNESIUM	7439-95-4	3150.0	81500.0	26891.8	26891.8	NC	NC	NC	NC
MANGANESE	7439-96-5	203.0	1690.0	661.5	661.5	0.15	NC	57	NC
MERCURY	7439-97-6	0.0	0.5	0.1	0.1	0.002	NC	0.03	0.1
NICKEL	7440-02-0	4.4	44.4 J	23.2	23.2	0.1	NC	48	NC
POTASSIUM	7440-09-7	558.0	1930.0	1035.1	1035.1	NC	NC	NC	NC
SELENIUM	7782-49-2	1.3 J	1.3 J	1.3	0.5	0.05	NC	0.95	0.26
SODIUM	7440-23-5	210.0	3370.0	1043.2	1043.2	NC	NC	NC	NC
VANADIUM	7440-62-2	10.5	33.5	19.0	19.0	0.049	NC	180	NC
ZINC	7440-66-6	38.5	1010.0 J	184.5	184.5	5	NC	680	NC

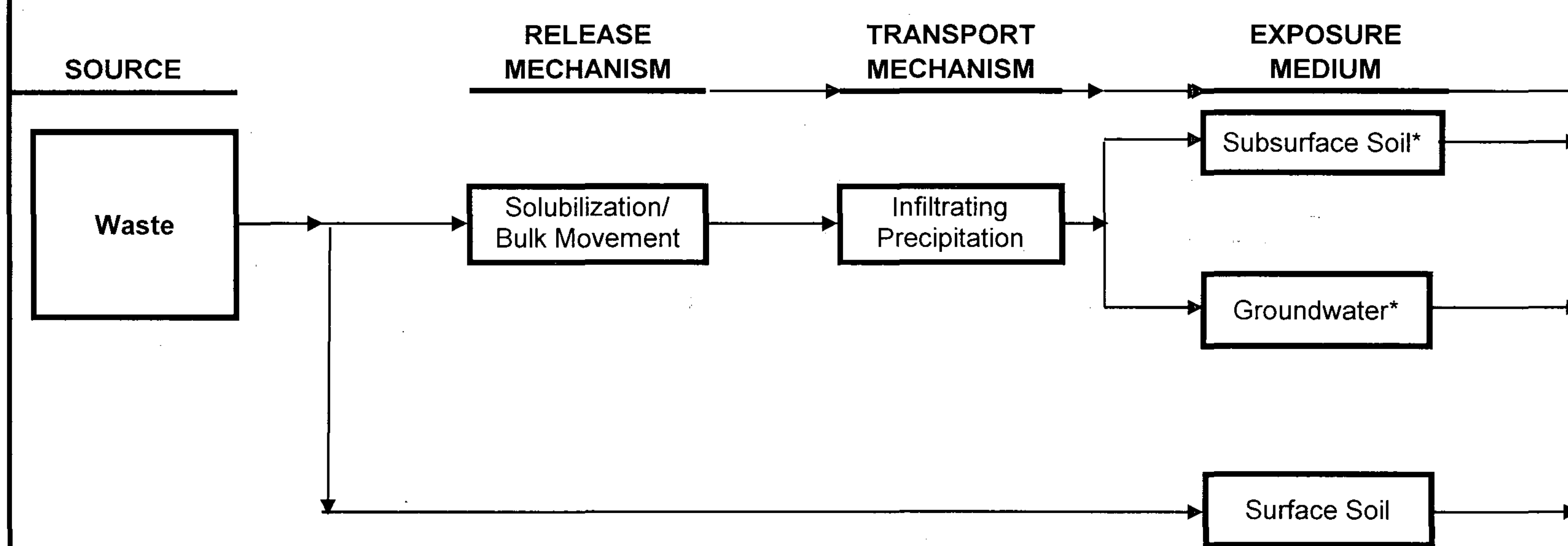
Associated Samples:
NTC21SB02-SO-0204
NTC21SB02-SO-0406
NTC21SB03-SO-0204
NTC21SB04-SO-0406
NTC21SB05-SO-0204
NTC21SB06-SO-0204
NTC21SB07-SO-0204
NTC21SB08-SO-0204
NTC21SB09-SO-0204
NTC21SB10-SO-0406
NTC21SB11-SO-0204
NTC21SB12-SO-0204
NTC21SB13-SO-0204
NTC21SB14-SO-0204
NTC21SB15-SO-0204
NTC21SB16-SO-0204
NTC21SB17-SO-0507
NTC21SB18-SO-0507

Notes:
1 - Duplicate analytical results are not be used for the EPC calculations. Data values less than sample-specific detection limits are reported as the detection limit.
2 - The maximum detected concentration is used for screening purposes
3 - Section 742 Table A, Tier 1 Soil Remediation Objectives for Residential Properties (online, 2010).
4 - Soil Remediation Objectives for Residential Properties, Non-TACO Chemicals (2010)
5 - USEPA ORNL Soil Screening Level for the Potection of Groundwater (USEPA, 2008)
Values are for hexavalent chromium.
Acenaphthene is used as a surrogate for acenaphthylene
Pyrene is used as a surrogate for benzo(ghi)perylene and phenanthrene
Nickel criteria based on nickle soluble salts
BAP equivalent criteria based on BaP
Illinois EPA TACO and Non-TACO criteria for chlordane used as a surrogate for TACO and Non-TACO criteria for alpha- and gamma-chlordane
Illinois EPA TACO and Non-TACO criteria for endosulfan used as a surrogate for TACO and Non-TACO criteria for endosulfan I
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria.

Definitions:
J = Estimated value
NC = No criteria

FIGURE 5-1

HUMAN HEALTH CONCEPTUAL SITE MODEL
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS



POTENTIAL RECEPTORS

Exposure Medium	EXPOSURE ROUTE	Construction Worker (future scenario)	Maintenance/Occupational Worker (current and future scenarios)	Adolescent Trespasser (current scenario)	Future Civilian Resident	Future Military Resident
Subsurface Soil*	Dermal Contact	n			n	n
	Ingestion	n			n	n
	Inhalation	n			n	n
Groundwater*	Dermal Contact	n			n	n
	Ingestion				n	n
	Inhalation of Volatiles	n			n	n
	Vapor Intrusion into Indoor Air[1]					
Surface Soil	Dermal Contact	n	n	n	n	n
	Ingestion of soil	n	n	n	n	n
	Inhalation	n	n	n	n	n

* Future scenarios only

n = POTENTIALLY COMPLETE EXPOSURE PATHWAY

[1] No VOCs in Groundwater were detected at concentrations that exceed vapor intrusion screening criteria. Therefore, this pathway was not evaluated in the risk assessment.
A blank space indicates that the exposure route is not complete for this receptor.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 SUMMARY OF INVESTIGATION FINDINGS

Surface soil, subsurface soil, and groundwater analytical results were compared to regulatory screening criteria provided by the Illinois Tiered Approach to Corrective Action Objectives (TACO), Illinois Non-TACO, and United States Environmental Protection Agency (USEPA). Analytical results were compared against both the minimum regulatory screening values, which are primarily based on conservative residential exposure scenarios, and the applicable Illinois TACO Residential and Industrial criteria that address only ingestion and inhalation exposure routes. The results of the comparisons against the TACO Ingestion and Inhalation Remediation Objectives for Residential and Industrial recipients for surface soil, subsurface soil, and groundwater are summarized below.

Surface Soil Results

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)flouranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene, were detected at concentrations above TACO Ingestion Remediation Objectives (Residential and/or Industrial). The highest concentrations of these constituents were encountered at one sample location, NTC21-SB-21, where they exceeded 12 times the average concentration. Manganese and lead were detected at concentrations above TACO Ingestion Remediation Objectives (Residential only).

Benzo(a)anthracene was detected at concentrations that exceed TACO Ingestion Residential (900 ug/kg) and/or Industrial (8,000 ug/kg) Soil Remediation Objectives in soil samples collected from NTC21-SB-01, NTC21-SB-03, NTC21-SB-07, NTC21-SB-11, and NTC21-SB-21.

Benzo(a)pyrene was detected at concentrations that exceed TACO Ingestion Residential (90 ug/kg) and/or Industrial (800 ug/kg) Soil Remediation Objectives in soil samples collected from NTC21-SB-01 through NTC21-SB-03, NTC21-SB-05, NTC21-SB-07 through NTC21-SB-12, NTC21-SB-14, and NTC21-SB-17 through NTC21-SB-22.

Benzo(b)flouranthene was detected at concentrations that exceed TACO Ingestion Residential (900 ug/kg) and/or Industrial (8,000 ug/kg) Soil Remediation Objectives in soil samples collected from NTC21-SB-01, NTC21-SB-03, NTC21-SB-07, NTC21-SB-08, NTC21-SB-10, NTC21-SB-11, NTC21-SB-17, and NTC21-SB-21.

Benzo(k)fluoranthene was detected at a concentration of 21,000 ug/kg (estimated) in soil sample NTC21-SB-21, located slightly south of Building 1517. This concentration exceeded the TACO Residential Ingestion Soil Remediation Objective value of 9,000 ug/kg.

Dibenzo(a,h)anthracene was detected at concentrations that exceed TACO Ingestion Residential (90 ug/kg) and/or Industrial (800 ug/kg) Soil Remediation Objectives in soil samples collected from NTC21-SB-01, NTC21-SB-03, NTC21-SB-08, NTC21-SB-10, NTC21-SB-11, NTC21-SB-17, and NTC21-SB-21.

Lead was detected at concentrations that exceed TACO Residential Ingestion (400 mg/kg) Soil Remediation Objectives in soil samples collected from NTC21-SB-10 and NTC21-SB-13.

Manganese was detected at a concentration of 2,420 J mg/kg in soil sample NTC21-SB-14, located directly north of Building 1517. This concentration exceeded the TACO Residential Ingestion Soil Remediation Objective value of 1,600 mg/kg.

Subsurface Soil Results

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)flouranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene, were detected at concentrations above TACO Ingestion Remediation Objectives (Residential and/or Industrial). The highest concentrations of these constituents were encountered at one sample location, NTC21-SB-03, where they exceeded 16 times the average concentration. Manganese was detected at concentrations above TACO Ingestion Remediation Objectives (Residential only).

Benzo(a)anthracene was detected at concentrations that exceed TACO Ingestion Residential (900 ug/kg) and/or Industrial (8,000 ug/kg) Soil Remediation Objectives in soil samples collected from NTC21-SB-02, NTC21-SB-03, and NTC21-SB-07.

Benzo(a)pyrene was detected at concentrations that exceed TACO Ingestion Residential (90 ug/kg) and/or Industrial (800 ug/kg) Soil Remediation Objectives in soil samples collected from NTC21-SB-02, NTC21-SB-03, NTC21-SB-05 through NTC21-SB-09, NTC21-SB-11, NTC21-SB-12 NTC21-SB-22.

Benzo(b)flouranthene was detected at concentrations that exceed TACO Ingestion Residential (900 ug/kg) and/or Industrial (8,000 ug/kg) Soil Remediation Objectives in soil samples collected from NTC21-SB-02, NTC21-SB-03, NTC21-SB-07, NTC21-SB-08, and NTC21-SB-12.

Benzo(k)fluoranthene was detected at a concentration of 14,000 ug/kg in soil sample NTC21-SB-03 at a depth of 2 to 4 ft bgs, located in the northwest corner of the site, which is the former location of the incinerator. This concentration exceeded the TACO Residential Ingestion Soil Remediation Objective value of 9,000 ug/kg.

Dibenzo(a,h)anthracene was detected at concentrations that exceed TACO Ingestion Residential (90 ug/kg) and/or Industrial (800 ug/kg) Soil Remediation Objectives in soil samples collected from NTC21-SB-02, NTC21-SB-03, NTC21-SB-08, and NTC21-SB-12.

Indeno(1,2,3-cd)pyrene was detected at concentrations that exceed TACO Ingestion Residential (900 ug/kg) and/or Industrial (8,000 ug/kg) Soil Remediation Objectives in soil samples collected from NTC21-SB-03 and NTC21-SB-07.

Manganese was detected at a concentration of 1,690 mg/kg in soil sample NTC21-SB-09 at a depth of 2 to 4 feet bgs, located southeast of Building 1517. This concentration exceeded the TACO Residential Ingestion Soil Remediation Objective value of 1,600 mg/kg.

Groundwater Results

Pentachlorophenol, iron, and manganese were detected at concentrations above TACO Class I Groundwater criteria.

Pentachlorophenol was detected in one sample collected from NTC21-MW-01 at a concentration [7.8 (estimated) ug/L] exceeding TACO Class I Groundwater criteria (1.0 ug/L). Monitoring well NTC21-MW-01 is located in the northwest corner of the site, which is the former location of the incinerator.

Iron was detected in one sample collected from NTC21-MW-02 at a concentration (34,000 ug/L) exceeding TACO Class I Groundwater criteria (5,000 ug/L). Monitoring well NTC21-MW-02 is located north of Building 7801.

Manganese was detected at concentrations that exceed TACO Class I Groundwater criteria (150 ug/L) in groundwater samples collected from NTC21-MW-02 through NTC21-MW-05.

Summary of Impact to Media

It is difficult to assess whether impacts to media are due to current or past activities. Constituents encountered in the soil and groundwater at the site are consistent with the current industrial use of site facilities as paint, electrical, plumbing, etc. shops; a temporary hazardous waste storage area; and the garage and fueling station for base support and government vehicles, in addition to offices. Concentrations of semivolatile organics in soil were relatively high at two sampling locations, NTC21-SB-03 and SB-21. Impacts to subsurface soil in SB-03, located the northwest portion of the site could be related to discharges from Building 1600A or on-site spills as well as past uses. Impacts to surface soil in SB-03, located near the shop storage area south of Building 1517, could be related to a spill as well as past uses. Elevated inorganic levels could be related to the past use of the site for coal storage.

6.2 SUMMARY OF HUMAN HEALTH RISK ASSESSMENT

Four potential receptor groups were evaluated in the HHRA for Site 21. These included: occupational/maintenance workers, adolescent trespassers, adult and child residents, and construction workers. Non-carcinogenic and carcinogenic risks were evaluated for these receptors under RME and CTE exposure scenarios. Evaluations considered exposure to surface and subsurface soil, and groundwater. Exposure to groundwater was considered under scenarios where it would and wouldn't be used for domestic purposes. The scenario where it wouldn't be used is based on the assumption that an ordinance would remain in place against it use.

Non-Carcinogenic Risks

Pathway-specific RME and CTE HIs are less than or equal to 1.0 for occupational/maintenance workers and adolescent trespassers in the study area. However, RME and CTE total HIs (12 and 2, respectively) are greater than 1.0 for the future construction workers in the study area. For future construction workers, inhalation of manganese and arsenic on particulates/dusts from surface and subsurface soil accounted predominantly for the non-carcinogenic risk for both the RME and CTE scenarios. Groundwater HIs for the construction worker scenario for both RME and CTE were below 1.0.

Non-Carcinogenic Risks - Residential Scenario with No Domestic Groundwater Use

RME and CTE HIs for future adult residents were less than 1.0 if the domestic use of groundwater pathways are not included. For this reason, with the groundwater ordinance in place, adverse non-carcinogenic health effects are also not anticipated for these receptors. RME HIs are greater than 1.0 for future child residents in the study area. However, the CTE HIs for the future child resident are less than or equal to 1.0. For future child residents, ingestion of arsenic, iron, and cobalt from subsurface and surface soil are the primary items of concern in the RME scenario.

Non-Carcinogenic Risks - Residential Scenario with Domestic Groundwater Use

Direct exposure to groundwater at Site 21 is not expected to occur under current and/or future land uses. However, the residential groundwater scenario was also evaluated based on the assumption that groundwater at the site, although very unlikely, could be used as a source of domestic drinking water in the future. Pathway-specific RME and CTE HIs were greater than 1.0 for child and adult residents in the study area under this scenario. For future child residents, ingestion of subsurface and surface soil and ingestion of groundwater are the primary pathways of concern in the RME scenario with multiple COPCs contributing to these estimates. For future adult residents, ingestion of cobalt, iron, and manganese in the groundwater would be the primary item of concern in this RME scenario.

Carcinogenic Risks

RME and CTE cancer risk estimates for construction workers, adolescent trespassers, and occupational/maintenance workers for Site 21 do not exceed the target USEPA and Illinois TACO Tier 3 cancer risk range ($1x10^{-4}$ to $1x10^{-6}$). While RME cancer risk estimates for these receptors exceed the Illinois EPA risk goal ($1x10^{-6}$) for TACO Tier 1 and 2, the baseline risk assessment provided in this report is consistent with a Tier 3 Evaluation.

Carcinogenic Risks - Residential Scenario with No Domestic Groundwater Use

The total site (excluding the domestic use of groundwater) RME cancer risk estimates for total future residents (adult and child) exceed the target USEPA and Illinois EPA TACO Tier 3 cancer risk range ($1x10^{-4}$ to $1x10^{-6}$) and the Illinois EPA TACO Tier 1 and 2 risk goal ($1x10^{-6}$). The CTE risk estimate is within the target USEPA and Illinois EPA TACO Tier 3 cancer risk range, but exceeds the Illinois EPA TACO Tier 1 and 2 risk goal. The major contributors to cancer risk at Site 21 under this scenario are primarily arsenic and c-PAHs, and to a lesser degree Aroclor-1260 and dioxins, in surface and subsurface soil.

Carcinogenic Risks - Residential Scenario with Domestic Groundwater Use

The total site (soil and groundwater) RME cancer risk estimate for total future residents (adult and child) exceeds the target USEPA and Illinois EPA TACO Tier 3 cancer risk range ($1x10^{-4}$ to $1x10^{-6}$) and the Illinois EPA TACO Tier 1 and 2 risk goal ($1x10^{-6}$). The CTE risk estimate is within the target USEPA cancer risk range, but exceeds the Illinois EPA TACO Tier 1 and 2 risk goal. The major contributors to cancer risk at Site 21 under this scenario are arsenic and c-PAHs in subsurface and surface soil and to a lesser degree, dioxins and Arochlor-1260 in surface soil; and pentachlorophenol, arsenic, c-PAHs, tetrachloroethylene, dioxins, Aroclor-1260, and delta-BHC in groundwater.

Contaminants of Concern

Based on the non-cancer and cancer evaluations, the following contaminants with non-cancer HQs greater than 1.0 or with cancer risks greater than $1x10^{-4}$ were identified as COCs:

- c-PAHs, arsenic, and iron for residential exposure to surface soil.
- Arsenic, iron, cobalt, and c-PAHs for residential exposure to subsurface soil.
- Inhalation of manganese in subsurface and surface soil by construction workers.

If the domestic use of groundwater is taken into consideration, based on the non-cancer and cancer evaluations, the following contaminants with non-cancer HQs greater than 1.0 or with cancer risks greater than $1x10^{-4}$ were identified as COCs: arsenic, cobalt, iron, manganese, pentachlorophenol, and dioxins for residential exposure to groundwater. However, direct exposure to groundwater at Site 21 is not expected to occur under current and/or future land uses because the facility and the area surrounding the facility are supplied by public water, the facility has a groundwater use restriction in place, and there are no drinking water wells located downgradient of the site.

When the maximum concentrations of the inorganic compounds detected at Site 21 in surface soil were compared to background data established for use by the Illinois EPA, no inorganics were found to be below background, based on maximum concentrations. However, if the overall averages of detected inorganics were compared to the background data set, aluminum, antimony, arsenic, barium, cobalt, iron, manganese, and vanadium were below the background values. This indicates that it is possible that these inorganic compounds at Site 21 could be background constituents.

Carcinogenic risks were calculated using the highest concentrations of c-PAHs encountered at the site. These occurred for subsurface and surface soil at sampling locations NTC21-SB-03 and SB-21, respectively. Concentrations of c-PAHs at these two locations were relatively high compared to the results obtained from all of the other sampling location across Site 21. Therefore, theoretical excess lifetime cancer risks are likely overestimated given the application of the maximum detected soil concentration of BaP Equivalents as the EPC. Inclusion of such high outlier maximum concentrations also will yield the calculation of relatively high mean and 95 percent UCL of the mean concentrations, potentially resulting in an overestimation of risks for scenarios that use statistical values as EPCs.

6.3 RECOMMENDATIONS

Soil

Recommendations for soil will be provided in final document.

Groundwater

Recommendations for groundwater will be provided in final document.

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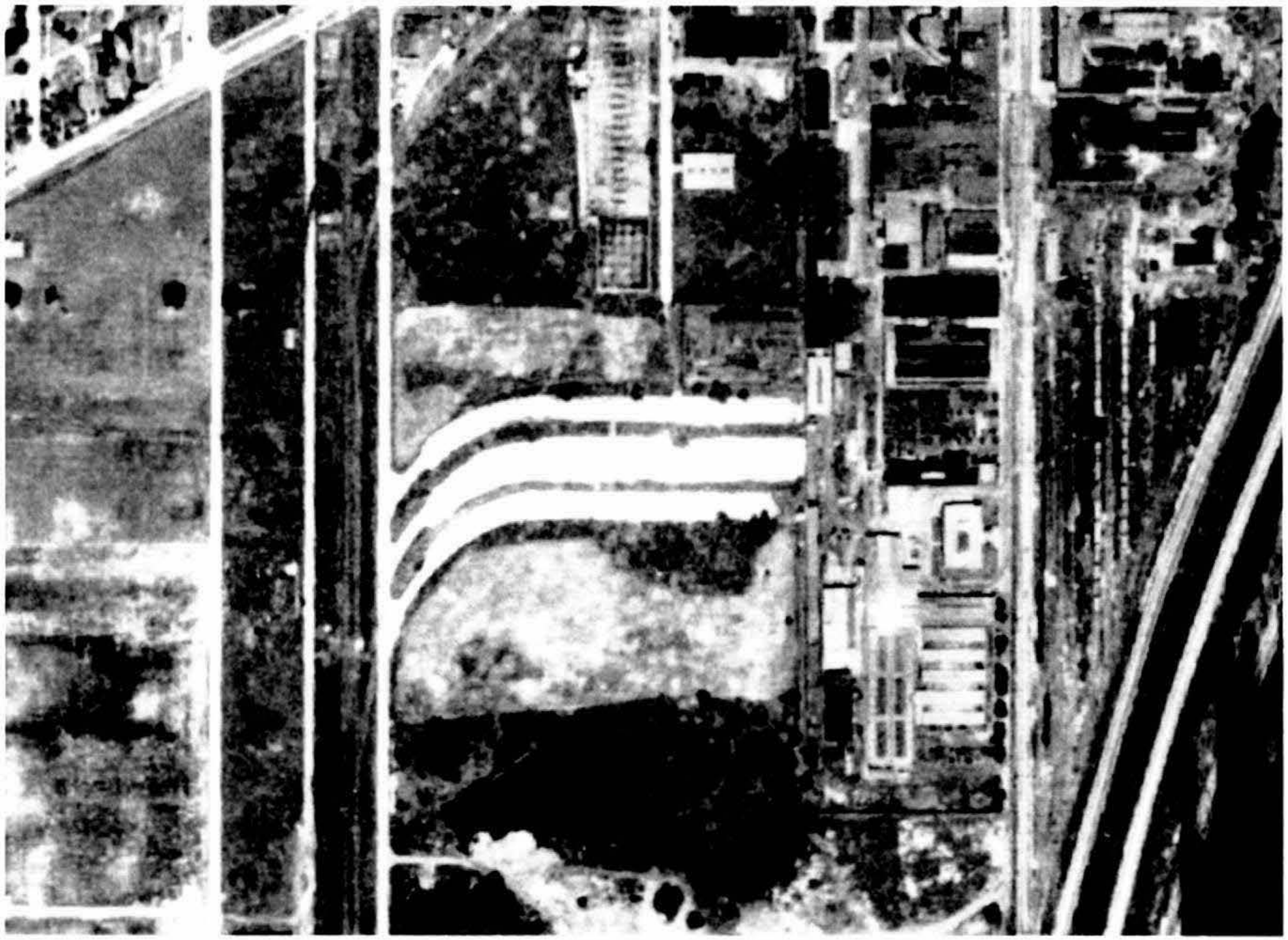
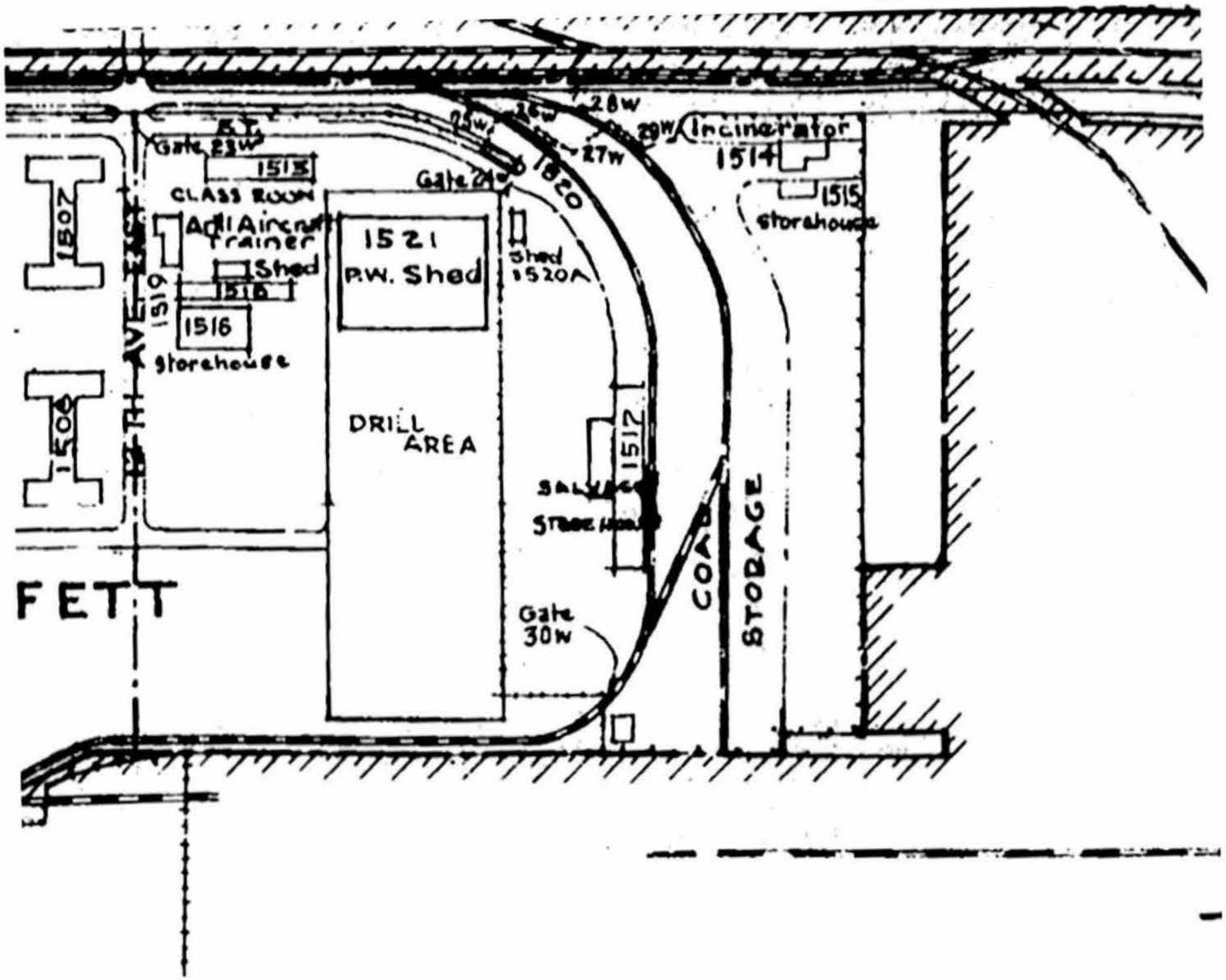
APPENDIX A

HISTORICAL DRAWINGS AND PHOTOGRAPHS

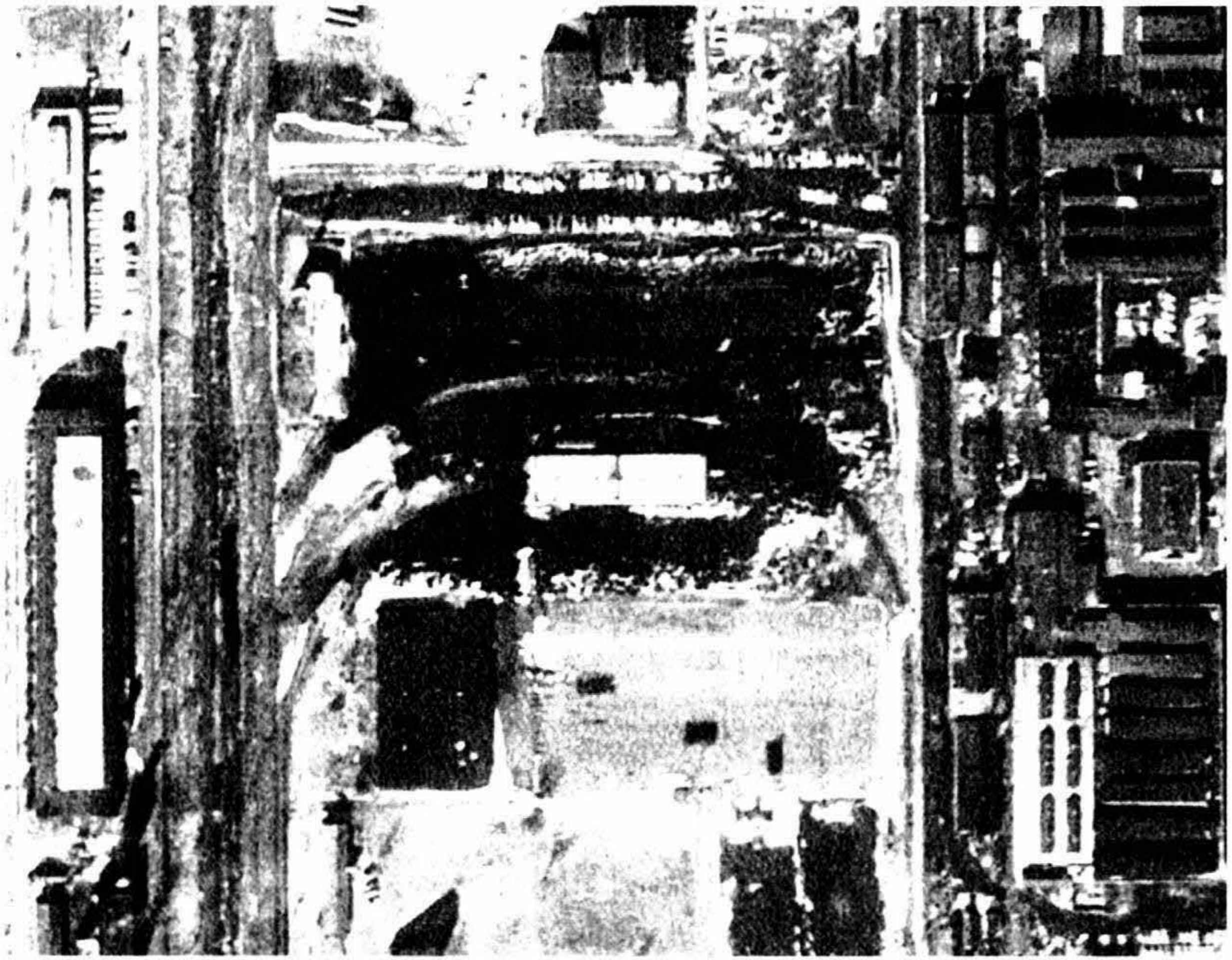
1939 Photo



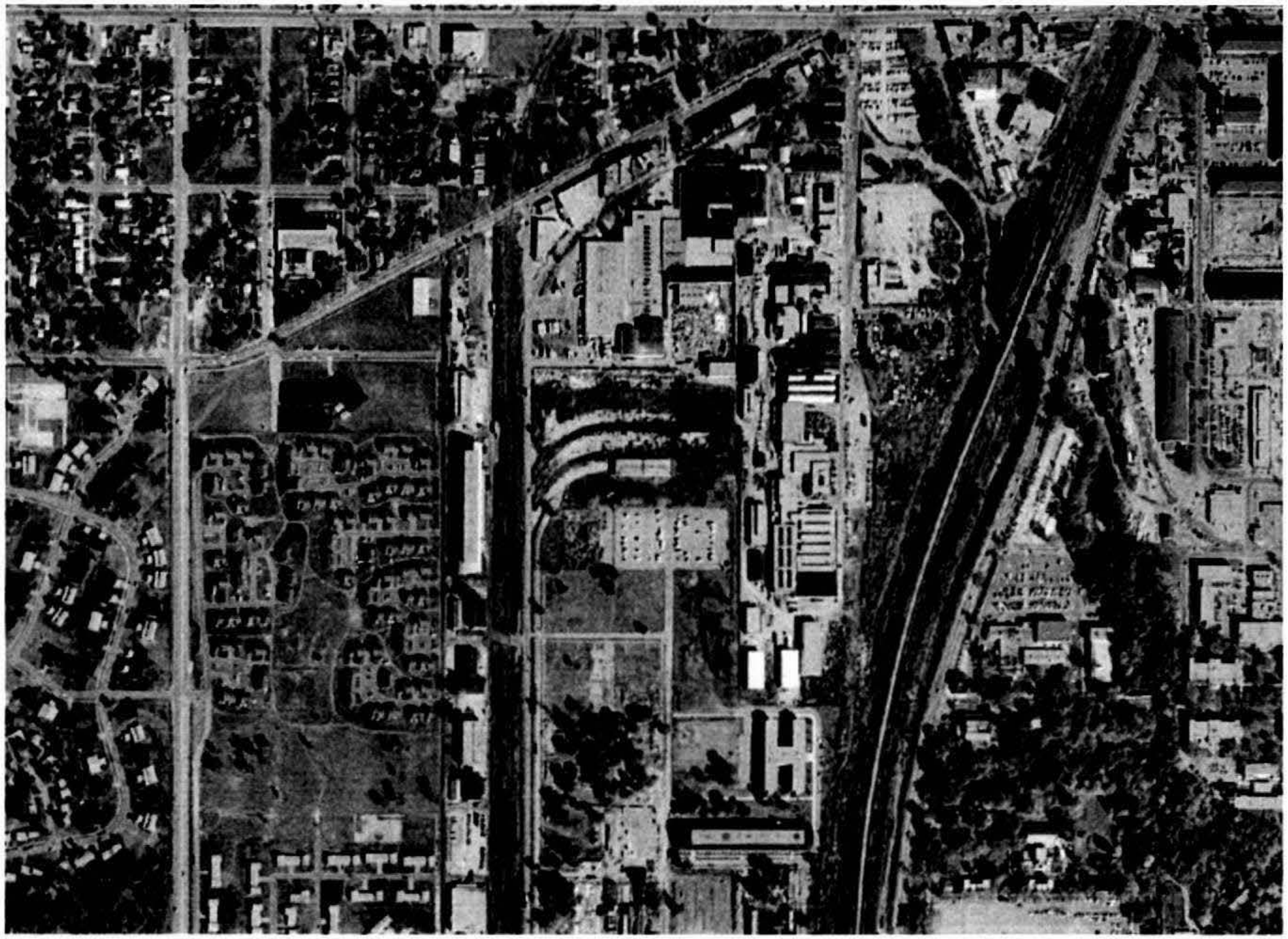
1950 Drawing



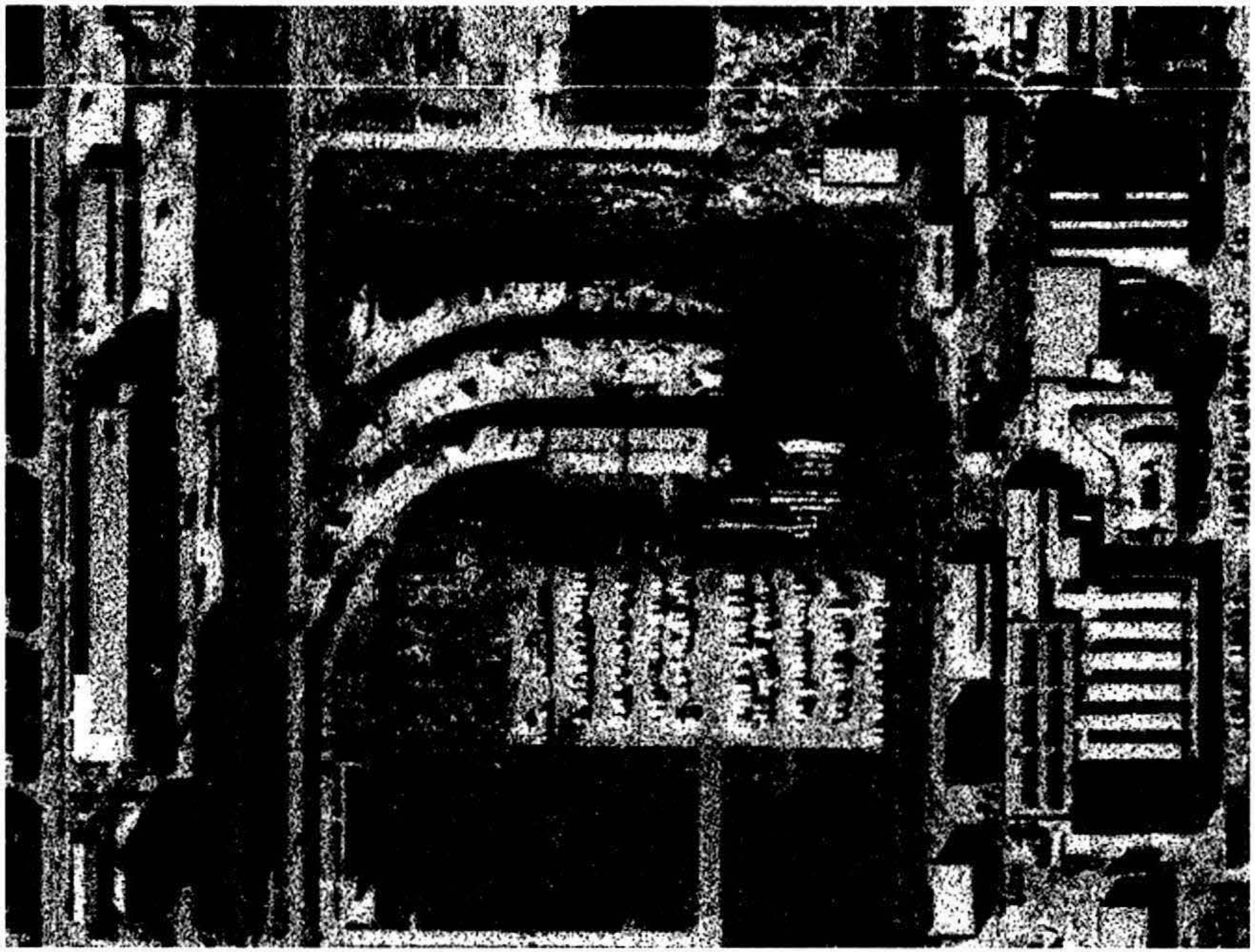
1964 Photo



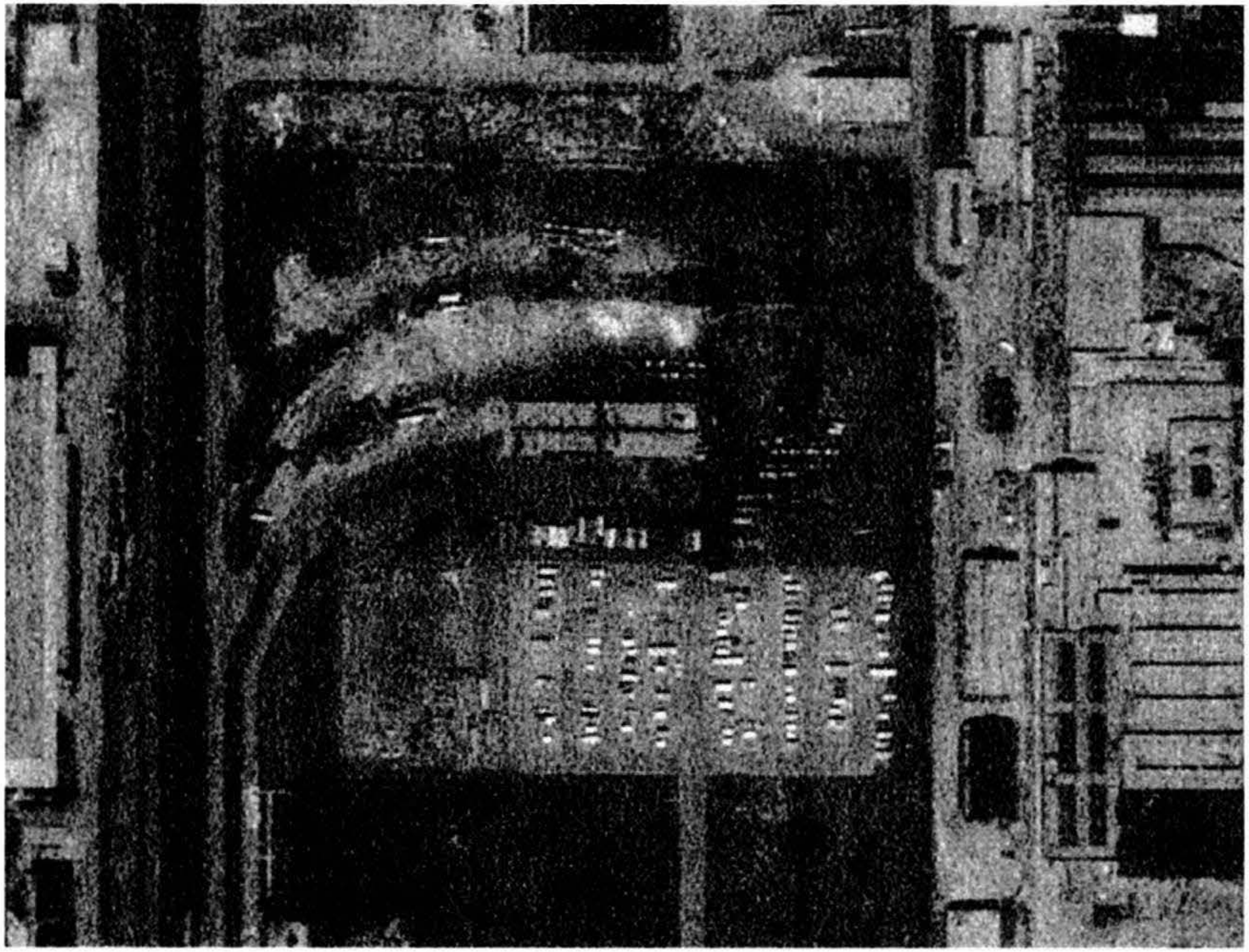
1974 Photo



1977 Photo

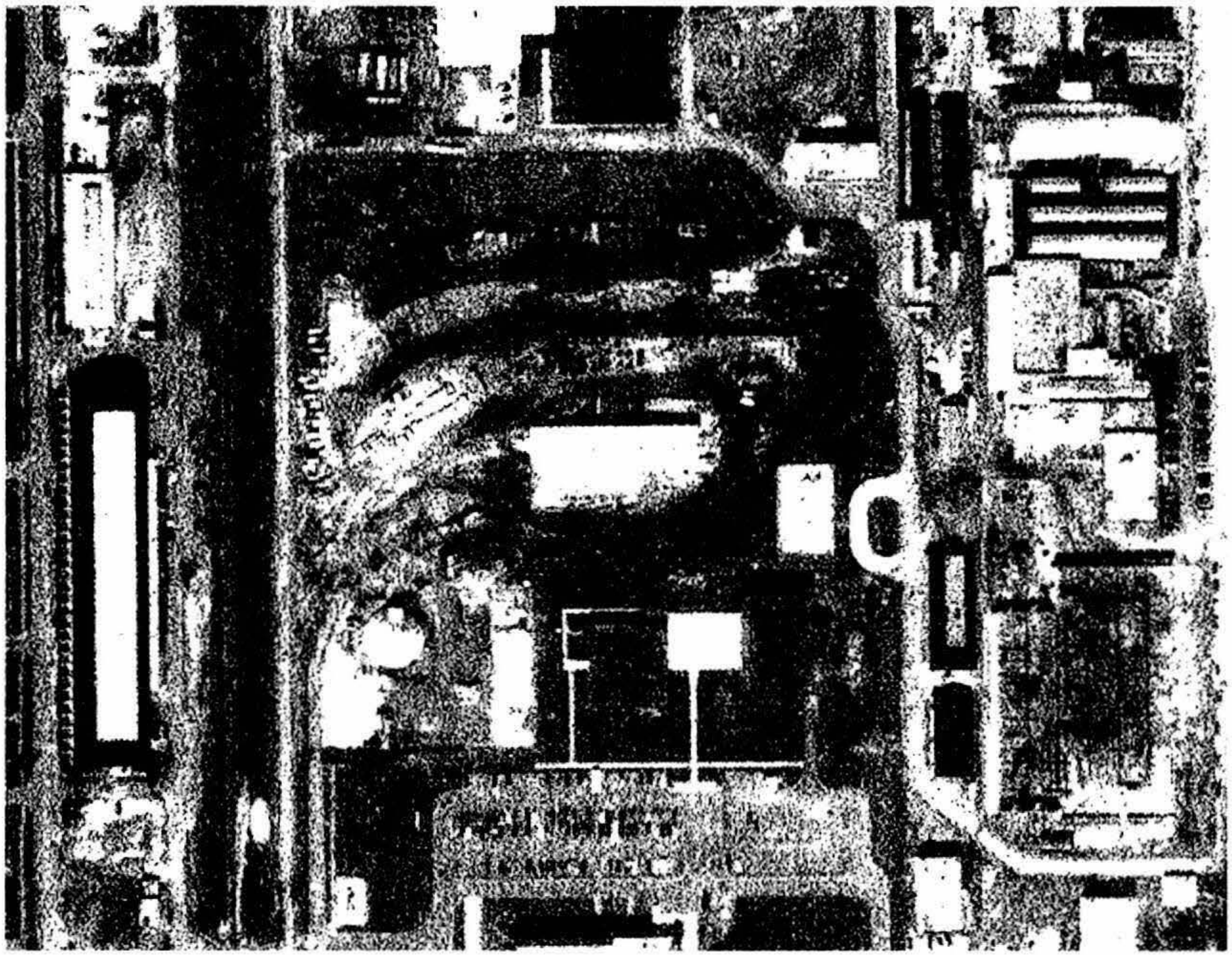


1980 Photo

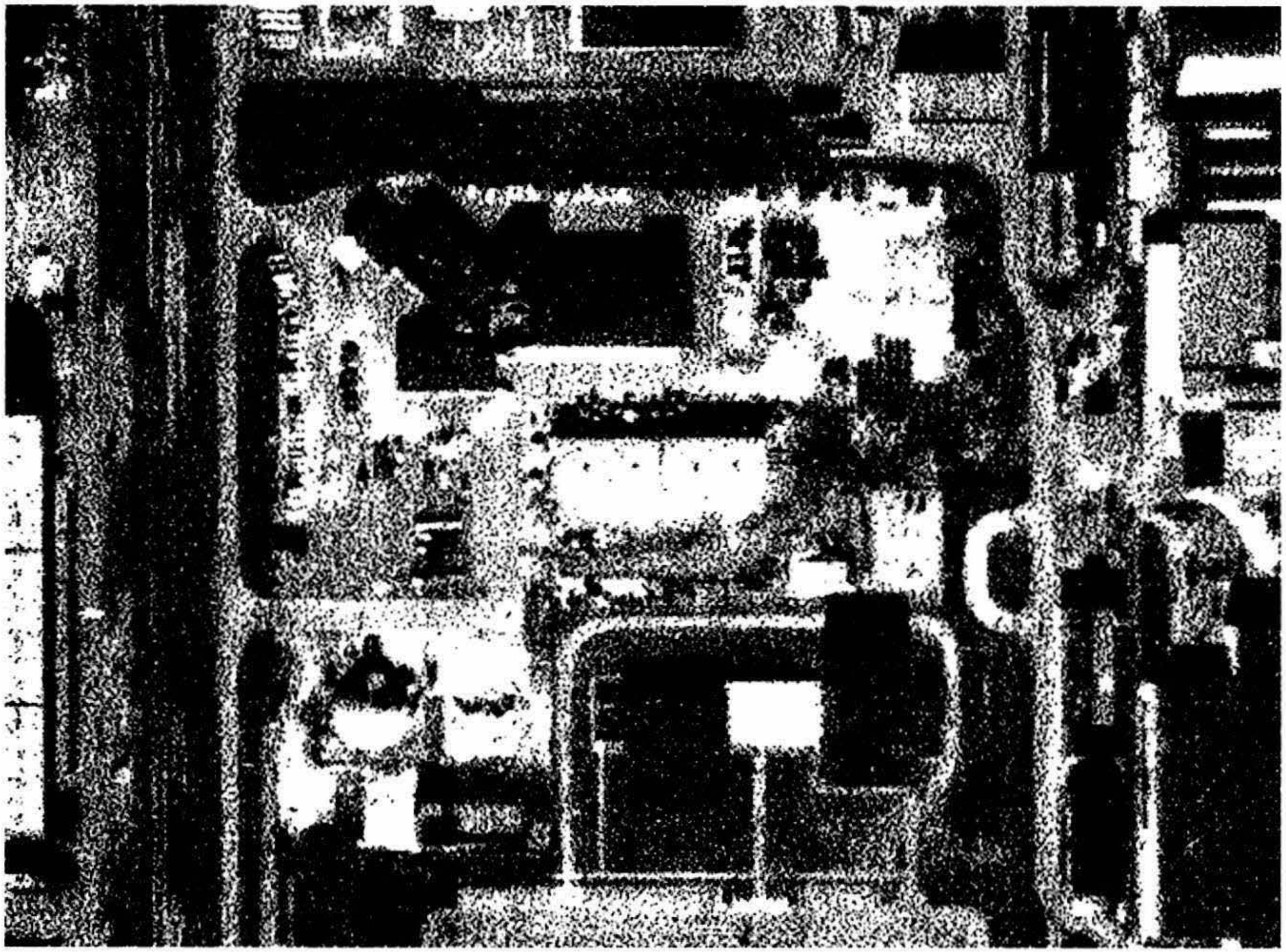


1985 Photo

1990 Photo

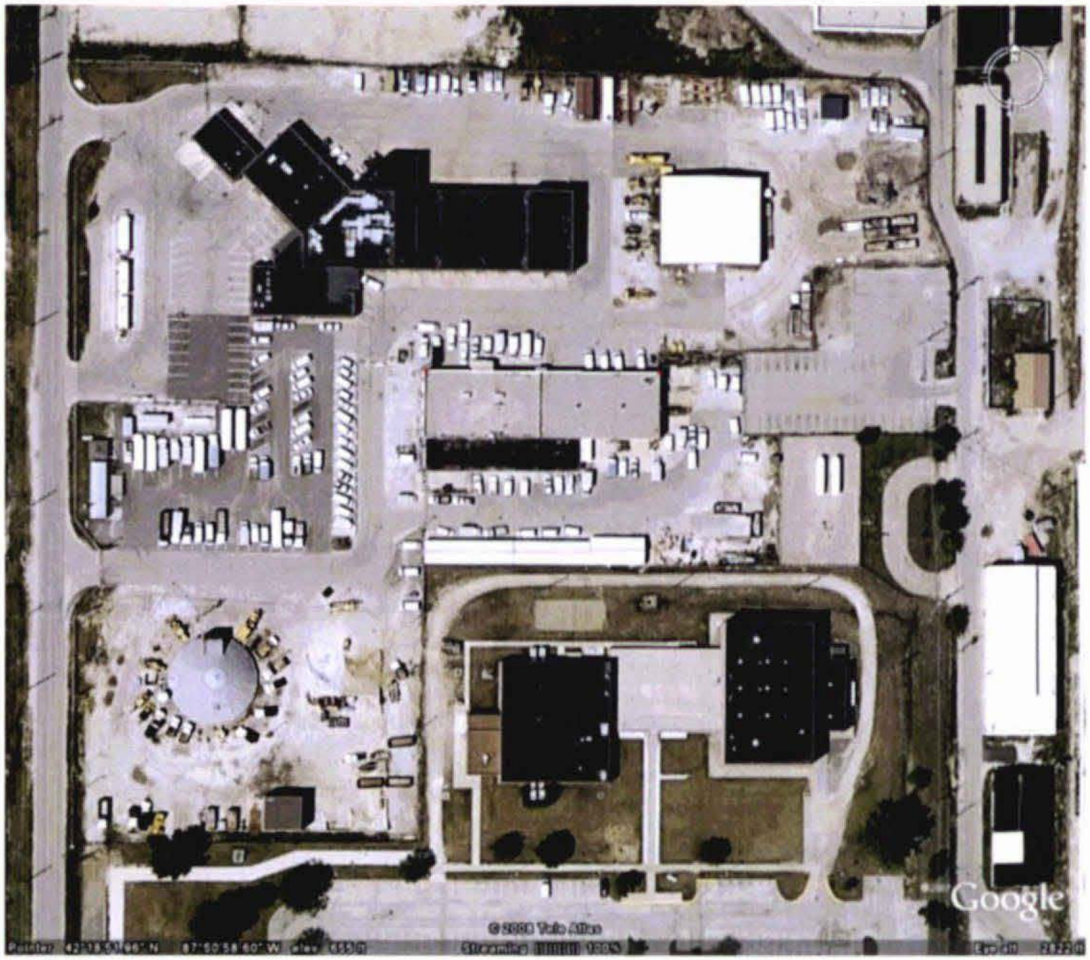


1995 Photo



2002 Photo

Current Photo



APPENDIX B

FIELD FORMS – SITE 21 SI

B-1 FIELD TASK MODIFICATION REQUEST FORMS

TETRA TECH NUS
FIELD TASK MODIFICATION REQUEST FORM

NAVSTA - Site 21
Project/Installation Name

112G01797
CTO & Project Number

1
Task Mod. Number

SAP
Modification To (e.g. Work Plan)

SB01-03
Site/Sample Location

9/26/09
Date

Activity Description: Refusal at 4-5' bgs - could not collect deeper samples

Reason for Change: Refusal of DPT

Recommended Disposition: Collect sample during next phase of work when installing MW01 w/ HSA

[signature]
Field Operations Leader (Signature)

9/26/09
Date

Approved Disposition:

[signature] Cummings
Project/Task Order Manager (Signature)

11/25/09
Date

Distribution:

Program/Project File –
Project/Task Order Manager –
Field Operations Leader –

Other:

TETRA TECH NUS
FIELD TASK MODIFICATION REQUEST FORM

NAVSTA -Site 21	112G01797	2
Project/Installation Name	CTO & Project Number	Task Mod. Number
SAP	All locations	11/24/09
Modification To (e.g. Work Plan)	Site/Sample Location	Date

Activity Description: only professionally Survey MW's

Reason for Change: Time between advancing Soil borings and MW's- difficult to find locations

Recommended Disposition: only professionally survey MW's

[signature] 11/24/09

Field Operations Leader (Signature) Date

Approved Disposition:

[signature] 11/25/09

Project/Task Order Manager (Signature) Date

Distribution:

Program/Project File –
Project/Task Order Manager –
Field Operations Leader –

Other:

B-2 BORING LOGS

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB01
Start Date: 09/28/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/28/2009
Drilling Company:
Lead Driller:
Background PID Screening: 0.0 ppm
Drilling Rig:
Drilling Method:
Convert To Well? (Well ID): No (N/A)

Site 21 - Investigation - Boring ID: NTC21SB01

Depth (ft bgs)*	Run No.	Run % Recvy	Lithology USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening PID - sample
0	1	50	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
1			GP	light grey	-Select-	DMP	GRAVEL	subbase fill	
			SC-ML	brown	-Select-	MST	SAND with silt and clay	silt increases with depth trace gravel	
2									
3									

End of Boring: 4 feet bgs
Notes: Boring caved in to 2.3' bgs prior to obtaining GW level measurement. Boring is dry.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB02
Start Date: 09/28/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 11/13/2009
Drilling Company: TTL
Lead Driller: Chris White
Background PID Screening: 0.0 ppm
Drilling Rig: DPT/Split spoon
Drilling Method: Direct-Push Technology
Convert To Well? (Well ID): Yes (NTC21MW01)

Site 21 - Investigation - Boring ID: NTC21SB02									Analytical Results - Screening
	Run		Lithology						
Depth (ft bgs)*	No.	% Recvy	USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	PID - sample
0	1	92	SP-SM	black	dark brown	DRY	SAND with silt	primarily fill material trace gravel trace organics (grass at top)	
1									
2									
3									
4	2	100							
5									
6									
7									

End of Boring: 8 feet bgs
Notes: Boring caved in to 2' bgs prior to obtaining GW level measurement. Boring is dry. Returned to this location to install Monitoring Well. Collected an addition deeper san previously the DPT could not get past 4' bgs.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB03
Start Date: 09/28/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/28/2009
Drilling Company: TTL
Lead Driller: Chris White
Background PID Screening: 0.0 ppm
Drilling Rig: DPT
Drilling Method: Direct-Push Technology
Convert To Well? (Well ID): No (N/A)

Site 21 - Investigation - Boring ID: NTC21SB03										Analytical Results - Screening
	Run		Lithology							
Depth (ft bgs)*	No.	% Recvy	USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors		PID - sample
0	1	50	SP-SM	dark brown	-Select-	DRY	SAND with silt	trace gravel fill material		
1										
2										
3										

End of Boring: 4 feet bgs
Notes: Boring caved in to 4.9' bgs prior to obtaining GW level measurement. Boring is dry.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB04
Start Date: 09/27/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/27/2009
Drilling Company: TTL
Lead Driller: Chris White
Background PID Screening: 0.0 ppm
Drilling Rig: DPT
Drilling Method: Direct-Push Technology
Convert To Well? (Well ID): Yes (NTC21MW02)

Site 21 - Investigation - Boring ID: NTC21SB04

Depth (ft bgs)*	Run No.	Run % Recovery	USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening PID - sample
0	1	75	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			GW	grey	-Select-	DRY	GRAVEL		
1			SP	black	dark orange	DRY	SAND	little silt trace gravel	
2									
3			SC-ML	black	brown	MST	SILT with sand and clay	trace gravel	
4	2	60	SM	black	-Select-	WET	SILTY SAND	trace gravel	
5			CL-ML	black	-Select-	WET	CLAYEY SILT	trace sand and gravel	
6									
7									
8	3	75	SM	brown	-Select-	WET	GRAVELLY SAND with silt		
9			SP	brown	-Select-	WET	SILTY SAND	trace fine-medium gravel silt increase with depth	
10									
11									
12	4	62	CL-ML	grey	-Select-	WET	CLAYEY SILT	trace sand and gravel	
13									
14									
15			SC-SM	grey	-Select-	MST	SAND with silt and clay	trace gravel	
16	5	100	CL-ML	grey	-Select-	MST	CLAYEY SILT	silt increases with depth trace sand and gravel	
17									
18									
19									
20	6	90							
21									
22									
23									
24	7	85							
25									
26									
27									

End of Boring: 28 feet bgs

Notes: Boring caved in to 17' bgs prior to obtaining GW level measurement.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB05
Start Date: 09/28/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/28/2009
Drilling Company:
Lead Driller:
Background PID Screening: 0.0 ppm
Drilling Rig:
Drilling Method:
Convert To Well? (Well ID): Yes (NTC21MW03)

Site 21 - Investigation - Boring ID: NTC21SB05										Analytical Results - Screening
	Run		Lithology							
Depth (ft bgs)	No.	% Recvy	USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors		PID - sample
0	1	85	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT			
			SP	black	brown	DRY	SAND	trace gravel fill material		
1			CL-ML	brown	-Select-	MST	CLAYEY SILT	little sand and gravel		
2										
3			SP	light brown	-Select-	DRY	GRAVELLY SAND	f-c sand and gravel		
4	2	60	SP	brown	-Select-	WET	SAND	fill trace silt and gravel		
5			CL	black	dark grey	WET	CLAY with sand and silt	reworked clay sand and silt decreases with depth		
6										
7										
8	3	67	CL	brown	grey-brown	WET	CLAY			
9										
10			SP	brown	-Select-	WET	SAND	trace silt and gravel		
11										

End of Boring: 12 feet bgs
Notes: None

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB06
Start Date: 09/27/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/27/2009
Drilling Company: TTL
Lead Driller: Chris White
Background PID Screening: 0.0 ppm
Drilling Rig: DPT
Drilling Method: Direct-Push Technology
Convert To Well? (Well ID): No (N/A)

Site 21 - Investigation - Boring ID: NTC21SB06

Depth (ft bgs)*	Run No.	Run % Recvy	USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening PID - sample
0	1	75	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			SP	black	light brown	MST	SAND	primarily fill material trace gravel	
1									
2									
3			SC-ML	brown	-Select-	MST	SILT with sand and clay	trace gravel	
4	2	75							
5			CL-ML	brown	-Select-	WET	CLAYEY SILT	trace sand and gravel	
6									
7									
8	3	75							
9									
10									
11									

End of Boring: 12 feet bgs
Notes: Boring stayed open to 12' bgs prior to obtaining GW level measurement.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB07
Start Date: 09/27/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/27/2009
Drilling Company: TTL
Lead Driller: Chris White
Background PID Screening: 0.0 ppm
Drilling Rig: DPT
Drilling Method: Direct-Push Technology
Convert To Well? (Well ID): No (N/A)

Site 21 - Investigation - Boring ID: NTC21SB07

Depth (ft bgs)*	Run No.	Run % Recvy	USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening: PID - sample
0	1	82	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			SP-SM	dark brown	dark orange	MST	SAND with silt	little f-m gravel	
1									
2									
3			CL-ML	grey-brown	-Select-	MST	CLAYEY SILT	little sand and trace gravel	
4	2	92	SC-SM	brown	-Select-	WET	SAND with silt and clay	trace gravel	
5			CL-ML	brown	grey-brown	WET	CLAYEY SILT	trace sand and gravel	
6									
7									
8	3	100							
9									
10									
11									

End of Boring: 12 feet bgs
Notes: Boring caved in to 7.1' bgs prior to obtaining GW level measurement.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Project Number: 112G01797
Drilling Company: TTL
Drilling Rig: DPT

Boring ID: NTC21SB08
Geologist: Shannon Hill
Lead Driller: Chris White
Drilling Method: Direct-Push Technology

Start Date: 09/28/2009
End of Boring Date: 09/28/2009
Background PID Screening: 0.0 ppm
Convert To Well? (Well ID): Yes (NTC21MW04)

Site 21 - Investigation - Boring ID: NTC21SB08

Depth (ft bgs)*	Run No.	Run % Recvy	Lithology USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening PID - sample
0	1	75	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			SP-SM	light brown	-Select-	DRY	SAND	little silt trace gravel fill material	
1			CL-ML	brown	-Select-	MST	CLAYEY SILT	little sand and trace gravel fill material	
2									
3			SM	brown	-Select-	MST	SAND with silt	little clay (native)	
4	2	70							
			CL-ML	brown	-Select-	MST	CLAYEY SILT	trace sand and gravel	
5									
6									
7									

End of Boring: 8 feet bgs
Notes: Boring caved in to 6.0' bgs prior to obtaining GW level measurement.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB09
Start Date: 09/26/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/26/2009
Drilling Company: TTL
Lead Driller: Chris White
Background PID Screening: 0.0 ppm
Drilling Rig: DPT
Drilling Method: Direct-Push Technology
Convert To Well? (Well ID): No (N/A)

Site 21 - Investigation - Boring ID: NTC21SB09

Depth (ft bgs)*	Run No.	Run % Recov	USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening: PID - sample
0	1	82	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			SP	black	dark brown	MST	SAND	trace silt and gravel	
1									
2			SC-SM	black	dark brown	MST	SAND with silt and clay	trace gravel	
3									
4	2	75							
5			CL-ML	brown	grey-brown	MST	CLAYEY SILT	trace sand and gravel	
6									
7									
8	3	95							
9									
10									
11									

End of Boring: 12 feet bgs
Notes: Boring caved in to 4.2' bgs prior to obtaining GW level measurement.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB10
Start Date: 09/26/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/26/2009
Drilling Company: TTL
Lead Driller: Chris White
Background PID Screening: 0.0 ppm
Drilling Rig: DPT
Drilling Method: Direct-Push Technology
Convert To Well? (Well ID): No (N/A)

Site 21 - Investigation - Boring ID: NTC21SB10

Depth (ft bgs)*	Run No.	Run % Recvy	USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening: PID - sample
0	1	80	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			SP	black	dark brown	DRY	SAND	Primarily fill material trace gravel	
1									
			CL-ML	brown	-Select-	MST	CLAYEY SILT	little sand and trace gravel	
2									
3									
4	2	55							
			CL-ML	brown	-Select-	MST	SILTY CLAY	trace sand	
5									
6									
7			CL-ML	grey-brown	-Select-	WET	SILTY CLAY	trace sand	
8	3	100	SC-SM	brown	-Select-	WET	SAND with silt and clay		
9			CL-ML	brown	grey-brown	WET	CLAYEY SILT	trace sand and gravel (clay increases with depth)	
10									
11									

End of Boring: 12 feet bgs
Notes: Boring caved in to 5.9' bgs prior to obtaining GW level measurement.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB11
Start Date: 09/26/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/26/2009
Drilling Company:
Lead Driller:
Background PID Screening: 0.0 ppm
Drilling Rig:
Drilling Method:
Convert To Well? (Well ID): No (N/A)

Site 21 - Investigation - Boring ID: NTC21SB11

Depth (ft bgs)*	Run No.	Run % Recvy	USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening: PID - sample
0	1	55	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			SP	black	dark brown	DRY	SAND	trace gravel	
1									
2									
3									
4	2	77	CL-ML	dark brown	-Select-	MST	SILTY CLAY	little sand and trace gravel	
5			ML	brown	grey-brown	MST	SILT	trace clay and sand	
6									
7									
8	3	77							
9			CL-ML	grey	-Select-	MST	CLAYEY SILT	trace sand and gravel	
10									
11									

End of Boring: 12 feet bgs
Notes: Boring caved in to 7.7' bgs prior to obtaining GW level measurement.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB12
Start Date: 09/26/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/26/2009
Drilling Company: TTL
Lead Driller: Chris White
Background PID Screening: 0.0 ppm
Drilling Rig: DPT
Drilling Method: Direct-Push Technology
Convert To Well? (Well ID): No (N/A)

Site 21 - Investigation - Boring ID: NTC21SB12

Depth (ft bgs)*	Run No.	Run % Recvy	Lithology USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening PID - sample
0	1	60	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			SP	black	dark brown	DRY	SAND	Primarily fill material trace gravel	
1									
2									
3									
4	2	65	SC-SM	brown	-Select-	WET	SAND with silt and clay	trace gravel	
5									
6									
7									
8	3	50	CL-ML	brown	grey	MST	CLAYEY SILT	trace gravel and sand	
9									
10									
11									

End of Boring: 12 feet bgs
Notes: Boring caved in to 7.7' bgs prior to obtaining GW level measurement.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB13
Start Date: 09/27/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/27/2009
Drilling Company: TTL
Lead Driller: Chris White
Background PID Screening: 0.0 ppm
Drilling Rig: DPT
Drilling Method: Direct-Push Technology
Convert To Well? (Well ID): No (N/A)

Site 21 - Investigation - Boring ID: NTC21SB13

Depth (ft bgs)*	Run No.	Run % Recvy	USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening: PID - sample
0	1	80	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			GW	grey	other - describe	DRY	GRAVEL	gray-white	
1			SP	black	dark orange	DRY	SAND	primarily fill material	
2									
3			CL	brown	-Select-	MST	CLAY	with some silt and sand trace gravel	
4	2	80							
5			SP	brown	-Select-	WET	SAND	trace gravel silt and sand	
6			CL-ML	brown	grey	WET	CLAYEY SILT	silt increase with depth trace sand and gravel	
7									
8	3	85							
9									
10									
11									

End of Boring: 12 feet bgs
Notes: Boring caved in to 6.6' bgs prior to obtaining GW level measurement.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB14
Start Date: 09/27/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/27/2009
Drilling Company: TTL
Lead Driller: Chris White
Background PID Screening: 0.0 ppm
Drilling Rig: DPT
Drilling Method: Direct-Push Technology
Convert To Well? (Well ID): No (N/A)

Site 21 - Investigation - Boring ID: NTC21SB14

Depth (ft bgs)*	Run No.	Run % Recvy	USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening: PID - sample
0	1	77	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			SP	dark brown	dark orange	DRY	SAND	little silt trace gravel	
1									
2			ML	black	brown	MST	SILT with clay	trace fine gravel	
3									
4	2	77	SC-SM	brown	-Select-	WET	SAND with silt and clay	trace gravel	
5									
6									
7			CL-ML	brown	grey	WET	CLAYEY SILT	trace sand and gravel	
8	3	95							
9									
10									
11									

End of Boring: 12 feet bgs
Notes: Boring caved in to 6.3' bgs prior to obtaining GW level measurement.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB15
Start Date: 09/27/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/27/2009
Drilling Company:
Lead Driller:
Background PID Screening: 0.0 ppm
Drilling Rig:
Drilling Method:
Convert To Well? (Well ID): No (N/A)

Site 21 - Investigation - Boring ID: NTC21SB15

Depth (ft bgs)*	Run No.	Run % Recvy	Lithology USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening PID - sample
0	1	75	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			SM	brown	dark orange	DRY	SILTY SAND	trace gravel-primarily fill	
1									
2									
3									
4	2	92	SC-SM	dark brown	-Select-	WET	SAND with silt and clay		
			SM	brown	-Select-	WET	SILTY SAND	silt increases with depth	
5									
			ML	grey	-Select-	WET	SILT	trace gravel and sand	
6			CL-ML	brown	-Select-	WET	SILTY CLAY	trace sand and gravel	
7			SC-SM	brown	-Select-	WET	SAND with silt and clay	trace gravel	

End of Boring: 8 feet bgs
Notes: Boring caved in to 6.3' bgs prior to obtaining GW level measurement.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Project Number: 112G01797
Drilling Company: TTL
Drilling Rig: DPT

Boring ID: NTC21SB16
Geologist: Shannon Hill
Lead Driller: Chris White
Drilling Method: Direct-Push Technology

Start Date: 09/27/2009
End of Boring Date: 09/27/2009
Background PID Screening: 0.0 ppm
Convert To Well? (Well ID): No (N/A)

Site 21 - Investigation - Boring ID: NTC21SB16

Depth (ft bgs)*	Run No.	Run % Recvy	Lithology USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening PID - sample
0	1	82	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			SP-SM	dark brown	dark orange	MST	SAND with silt	FILL trace gravel	
1									
2			CL-ML	dark grey	-Select-	MST	CLAYEY SILT	trace sand and gravel	
3			CL-ML	brown	-Select-	MST	CLAYEY SILT	trace sand and gravel	
4	2	82							
5			SC-SM	brown	-Select-	WET	SAND with silt and clay	trace gravel	
6									
7									
8	3	77							
9			CL-ML	brown	grey	WET	CLAYEY SILT	trace sand and gravel	
10									
11									

End of Boring: 12 feet bgs
Notes: Boring caved in to 5' bgs prior to obtaining GW level measurement. Boring dry.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB17
Start Date: 09/26/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/26/2009
Drilling Company:
Lead Driller:
Background PID Screening: 0.0 ppm
Drilling Rig:
Drilling Method:
Convert To Well? (Well ID): No (N/A)

Site 21 - Investigation - Boring ID: NTC21SB17

Depth (ft bgs)*	Run No.	Run % Recvy	USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening: PID - sample
0	1	77	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			CL-ML	dark brown	black	MST	SILTY CLAY	trace sand and gravel	
1									
2									
3			CL-ML	brown	-Select-	MST	SILTY SAND	little sand and trace gravel	
4	2	82							
5			SP	brown	-Select-	WET	SAND with silt and clay	little silt and clay trace gravel	
6									
7			SP	brown	-Select-	WET	SAND with silt and clay	little fine gravel	
8	3	95	CL-ML	brown	grey-brown	WET	CLAYEY SILT	trace sand and gravel	
9									
10									
11									

End of Boring: 12 feet bgs
Notes: Boring caved in to 8.6' bgs prior to obtaining GW level measurement.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB18
Start Date: 09/26/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/26/2009
Drilling Company: TTL
Lead Driller: Chris White
Background PID Screening: 0.0 ppm
Drilling Rig: DPT
Drilling Method: Direct-Push Technology
Convert To Well? (Well ID): Yes (NTC21MW06)

Site 21 - Investigation - Boring ID: NTC21SB18

Depth (ft bgs)*	Run No.	Run % Recvy	USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening: PID - sample
0	1	50	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			CL-ML	dark brown	-Select-	MST	SILTY CLAY	trace sand	
1			CL-ML	brown	-Select-	MST	SILTY CLAY	trace sand and gravel	
			SC-SM	brown	-Select-	MST	SAND with silt and clay	little fine gravel	
2									
3									
4	2	50							
5									
6									
7			SC-SM	brown	-Select-	WET	SAND with silt and clay	little gravel	
8	3	55							
9									
10			SC-SM	grey	-Select-	WET	SAND with silt and clay	little fine gravel	
11									

End of Boring: 12 feet bgs
Notes: Boring caved in to 8.6' bgs prior to obtaining GW level measurement.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB19
Start Date: 09/27/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/27/2009
Drilling Company:
Lead Driller:
Background PID Screening: 0.0 ppm
Drilling Rig:
Drilling Method:
Convert To Well? (Well ID): No (N/A)

Site 21 - Investigation - Boring ID: NTC21SB19

Depth (ft bgs)*	Run No.	Run % Recvy	USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening: PID - sample
0	1	50	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			SP	black	-Select-	DRY	SAND	fill trace gravel	
1									
2									
3			CL-ML	dark grey	-Select-	MST	CLAYEY SILT	trace sand and gravel	
4	2	75	CL-ML	brown	-Select-	MST	CLAYEY SILT	trace sand and gravel	
5			SC-SM	brown	-Select-	WET	CLAY with sand and silt	trace gravel	
6									
7									
8	3	100							
9			CL-ML	grey	-Select-	WET	CLAYEY SILT	trace sand and gravel	
10									
11									

End of Boring: 12 feet bgs
Notes: Boring caved in to 5' bgs prior to obtaining GW level measurement. Boring dry.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Project Number: 112G01797
Drilling Company: TTL
Drilling Rig: DPT

Boring ID: NTC21SB20
Geologist: Shannon Hill
Lead Driller: Chris White
Drilling Method: Direct-Push Technology

Start Date: 09/26/2009
End of Boring Date: 09/26/2009
Background PID Screening: 0.0 ppm
Convert To Well? (Well ID): No (N/A)

Site 21 - Investigation - Boring ID: NTC21SB20

Depth (ft bgs)*	Run No.	Run % Recvy	USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening: PID - sample
0	1	37	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
1			SW	brown	-Select-	DRY	SAND	little gravel	
2			CL-ML	dark brown	brown	MST	SILTY CLAY	trace sand and gravel clay and sand increases with depth	
3									
4	2	50							
5									
6			SC-SM	brown	-Select-	WET	SAND with silt and clay	trace gravel	
7									
8	3	50							
			CL-ML	grey-brown	grey	MST	CLAYEY SILT	trace sand and gravel	
9									
10									
11									

End of Boring: 12 feet bgs
Notes: Boring caved in to 7.6' bgs prior to obtaining GW level measurement.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB21
Start Date: 09/26/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/26/2009
Drilling Company: TTL
Lead Driller: Chris White
Background PID Screening: 0.0 ppm
Drilling Rig: DPT
Drilling Method: Direct-Push Technology
Convert To Well? (Well ID): No (N/A)

Site 21 - Investigation - Boring ID: NTC21SB21

Depth (ft bgs)*	Run No.	Run % Recvy	USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening: PID - sample
0	1	70	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			SP	black	brown	DRY	SAND	trace gravel	
1									
2			CL-ML	dark brown	brown	MST	SILTY CLAY	little sand and trace gravel	
3									
4	2	75	SC-SM	brown	-Select-	MST	SAND with silt and clay	little gravel	
5									
6									
7									
8	3	100	SM	brown	-Select-	WET	SILTY SAND		
9			CL-ML	brown	grey-brown	WET	CLAYEY SILT	silt increase with depth trace sand and gravel	
10									
11									

End of Boring: 12 feet bgs
Notes: Boring caved in to 7.2' bgs prior to obtaining GW level measurement.

Tetra Tech NUS, Inc.

BORING LOG

Project Name: GREAT LAKES NTC - Site 21 - Investigation - Event 1 - Site 21
Boring ID: NTC21SB22
Start Date: 09/27/2009
Project Number: 112G01797
Geologist: Shannon Hill
End of Boring Date: 09/27/2009
Drilling Company: TTL
Lead Driller: Chris White
Background PID Screening: 0.0 ppm
Drilling Rig: DPT
Drilling Method: Direct-Push Technology
Convert To Well? (Well ID): Yes (NTC21MW05)

Site 21 - Investigation - Boring ID: NTC21SB22

Depth (ft bgs)*	Run No.	Run % Recvy	Lithology USCS	Primary Color	Secondary Color	Moisture	Primary Description	Secondary Descriptors	Analytical Results - Screening PID - sample
0	1	87	OTHER	black	-Select-	DRY	ASPHALT/PAVEMENT		
			SP	black	dark brown	DRY	SAND	trace gravel	
1									
2									
3									
4	2	87	CL-ML	black	grey	MST	CLAYEY SILT	trace sand and gravel	
5			SC-SM	brown	-Select-	WET	SAND with silt and clay	trace gravel	
6									
7									
8	3	77							
			CL-ML	brown	grey-brown	WET	CLAYEY SILT	trace sand and gravel	
9									
10									
11									

End of Boring: 12 feet bgs
Notes: Boring caved in to 4.2' bgs prior to obtaining GW level measurement. Boring dry.

B-3 SAMPLE LOG SHEETS - SOIL

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB01-SO-0102	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB01	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/28/09		DPT	0.5	0.5	brown	

nalysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/28/09	12:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/28/09	12:00	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB02-SO-0204	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB02	**Created Date**	9/27/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/28/09		DPT	0.2	2	black	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/28/09	10:30	SW-846 8290	Dioxins/Furans	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	Run MS/MSD	ED00000105-2
✓	9/28/09	10:30	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	9	Glass - Clear	4 oz. wide-mouth w/Teflon cap	Run MS/MSD	ED00000105-1
✓	9/28/09	10:30	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	12	TerraCore	TerraCore	Run MS/MSD	ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

·roject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB02-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB02	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/28/09		DPT	0.3	0.5	black	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/28/09	10:20	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1
✓	9/28/09	10:20	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB02-SO-0406	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB02	**Created Date**	11/13/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
11/13/09		Split spoon	0.0	2	brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	11/13/09	09:12	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-3
✓	11/13/09	09:12	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-3

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

-oject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB03-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB03	**Created Date**	9/27/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/28/09	12:20	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/28/09	12:20	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB03-SO-0204	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB03	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/28/09		DPT	0.2	2	dark brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/28/09	12:30	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/28/09	12:30	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

'roject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB04-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB04	**Created Date**	9/27/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.4	0.5	black	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	12:50	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/27/09	12:50	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB04-SO-0406	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB04	**Created Date**	9/27/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.3	2	dark brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	13:00	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1
✓	9/27/09	13:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

roject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB05-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB05	**Created Date**	9/27/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/28/09		DPT	0.4	0.5	black	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/28/09	10:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/28/09	10:00	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB05-SO-0204	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB05	**Created Date**	9/27/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/28/09		DPT	0.5	2	brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/28/09	10:10	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/28/09	10:10	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

'roject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB06-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB06	**Created Date**	9/27/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.6	0.5	dark brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	15:10	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/27/09	15:10	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB06-SO-0204	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB06	**Created Date**	9/27/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.3	2	dark brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	15:20	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1
✓	9/27/09	15:20	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

roject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB07-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB07	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.4	0.5	dark brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	10:40	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/27/09	10:40	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB07-SO-0204	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB07	**Created Date**	9/27/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.3	2	dark brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	10:50	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/27/09	10:50	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

·oject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB08-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB08	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/28/09		DPT	0.4	0.5	brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/28/09	11:55	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/28/09	11:55	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB08-SO-0204	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB08	**Created Date**	9/27/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/28/09		DPT	0.3	2	brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/28/09	12:00	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1
✓	9/28/09	12:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/28/09	12:00	ASTM D422 (or as instructed by TtNUS)	Grain Size	None	1	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

-oject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB09-SO-0204	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB09	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/26/09		DPT	2.0	2	black	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/26/09	16:28	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1
✓	9/26/09	16:28	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB09-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB09	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/26/09		DPT	0.5	0.5	black	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/26/09	16:20	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1
✓	9/26/09	16:20	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/26/09	16:20	SW-846 8290	Dioxins/Furans	4°C	2	Glass - Amber	4 oz. wide-mouth w/Teflon cap		ED00000105-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

oject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB10-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB10	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/26/09		DPT	0.7	0.5	black	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/26/09	18:36	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/26/09	18:36	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB10-SO-0406	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB10	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/26/09		DPT	0.5	2	brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/26/09	18:40	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1
✓	9/26/09	18:40	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

roject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB11-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB11	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/26/09		DPT	0.4	0.5	black	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/26/09	18:10	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/26/09	18:10	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB11-SO-0204	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB11	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/26/09		DPT	0.3	2	dark brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/26/09	18:12	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/26/09	18:12	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

roject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB12-SO-0204	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB12	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/26/09		DPT	0.3	2	black	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/26/09	14:10	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/26/09	14:10	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB12-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB12	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/26/09		DPT	0.5	0.5	black	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/26/09	14:00	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1
✓	9/26/09	14:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

-oject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB13-SO-0204	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB13	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.2	2	brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	09:10	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/27/09	09:10	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB13-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB13	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.3	0.5	black	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	09:00	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1
✓	9/27/09	09:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

·oject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB14-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB14	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.3	0.5	dark brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	09:30	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	12	TerraCore	TerraCore	Run MS/MSD	ED00000105-1
✓	9/27/09	09:30	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	9	Glass - Clear	4 oz. wide-mouth w/Teflon cap	Run MS/MSD	ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB14-SO-0204	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB14	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.1	2	brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	09:40	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1
✓	9/27/09	09:40	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

·oject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB15-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB15	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.4	0.5	brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	10:00	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1
✓	9/27/09	10:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB15-SO-0204	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB15	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.3	2	brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	10:10	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1
✓	9/27/09	10:10	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

oject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB16-SO-0204	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB16	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.1	2	brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	16:50	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1
✓	9/27/09	16:50	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB16-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB16	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.3	0.5	black	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	17:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4° C/HNaO4S/MeOH	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/27/09	17:00	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

'roject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB17-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB17	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/26/09		DPT	1.2	0.5	dark brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/26/09	13:26	SW-846 8290	Dioxins/Furans	4°C	2	Glass - Amber	4 oz. wide-mouth w/Teflon cap		ED00000105-2
✓	9/26/09	13:26	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4° C/HNaO4S/MeOH	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/26/09	13:26	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB17-SO-0507	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB17	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/26/09		DPT	0.5	2	brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/26/09	13:32	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/26/09	13:32	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

oject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB18-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB18	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/26/09		DPT	0.6	0.5	dark brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/26/09	12:47	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/26/09	12:47	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB18-SO-0507	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB18	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/26/09		DPT	0.5	2	brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/26/09	12:59	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/26/09	12:59	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

roject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB19-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB19	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.0	0.5	black	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	17:40	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/27/09	17:40	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB19-SO-0204	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB19	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/10/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.3	2	dark brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	17:50	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/27/09	17:50	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

roject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB20-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB20	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/23/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/26/09		DPT	0.4	0.5	dark brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/26/09	16:57	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/26/09	16:57	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB20-SO-0406	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB20	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/23/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/26/09		DPT	0.3	2	brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/26/09	17:02	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/26/09	17:02	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

roject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB21-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB21	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/23/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/26/09		DPT	0.4	0.5	black	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/26/09	15:10	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1
✓	9/26/09	15:10	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB21-SO-0608	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB21	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/23/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/26/09		DPT	0.6	2	brown	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/26/09	15:20	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1
✓	9/26/09	15:20	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

oject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB22-SO-0204	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB22	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/23/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.4	2	black	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	12:10	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore		ED00000105-1
✓	9/27/09	12:10	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	NTC21SB22-SO-0001	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Sample Location ID**	NTC21SB22	**Created Date**	9/26/09
Task/Contract #	0064	**Sampled By**	Shannon Hill	**Modified By**	Shannon Hill
WBS Code #		**Concentration**	Low concentration	**Modified Date**	12/23/09
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
9/27/09		DPT	0.4	0.5	black	

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/27/09	12:00	SW-846 8260B	TCL VOCs	4° C/HNaO4S/MeO H	4	TerraCore	TerraCore		ED00000105-1
✓	9/27/09	12:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		ED00000105-1

General Observations and Notes

No Notes

- End of Report -

B-4 MONITORING WELL INSTALLATION SHEETS

Illinois Department of Public Health
WATER WELL CONSTRUCTION REPORT

Date MARCH 1 2010

TYPE OR PRESS FIRMLY WITH BLACK INK PEN. COMPLETE WITHIN 30 DAYS OF WELL COMPLETION AND SEND TO THE APPROPRIATE HEALTH DEPARTMENT.

1. Type of Well a. **Driven** Well Casing diam. ____in. Depth ____ft.
   b. **Bored** Well Buried Slab [ ] Yes [ ] No
   Hole Diameter ____in. to ____ft.; ____in. to ____ft.; ____in. to ____ft.
   c. **Drilled** Well **PVC** casing Formation packer set at depth of N/A ft.
   Hole Diameter 8 1/4 in. to 14 ft. ____in. to ____ft. ____in. to ____ft.

Type of Grout	# of Bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)

d. **Drilled** Well **Steel** Casing--- Mechanically Driven [ ] Yes [ ] No
Hole Diameter ____in. to ____ft. ____in. to ____ft. ____in. to ____ft.

Type of Grout	# of Bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)

e. Well finished within [X] Unconsolidated Materials [ ] Bedrock

f. Kind of Gravel Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
GLOBAL SILICA	#4	14.0	3.0

2. Well Use [ ] Domestic [ ] Irrigation [ ] Commercial [ ] Livestock [X] Monitoring [ ] Other
3. Date Well Completed NOV 13 2009 Well Disinfected [ ] Yes [ ] No
   Driller's estimated well yield ____gpm
4. Date Permanent Pump Installed ____
5. Pump Capacity ____gpm Set at (depth) ____ft.
6. Pitless Adapter Model and Manufacturer ____
7. Well Cap Type and Manufacturer ____
8. Pressure Tank Working Cycle ____gals. Captive Air [ ] Yes [ ] No
9. Pump System Disinfected [ ] Yes [ ] No
10. Name of Pump Company ____
11. Pump Installer ____ License # ____
12. ____ License # ____
    Licensed Pump Contractor Signature

NA

Illinois Department of Public Health
Division of Environmental Health
525 W. Jefferson St.
Springfield, IL 62761

DO NOT write on these lines

IMPORTANT NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 85-0863. **DISCLOSURE OF THIS INFORMATION IS MANDATORY.** This form has been approved by the Forms Management Center.

GEOLOGICAL AND WATER SURVEY WELL RECORD

13. Property Owner UNITED STATES NAVY Well # NTC 21 MW01
14. Driller CHRIS WHITE License # ____
15. Name of Drilling Co. TLC ASSOCIATES INC.
16. Permit No. ____ Date Issued ____
17. Date Drilling Started NOV. 13 2009
18. Well SITE address 24TH @ SPALDING ST. BLDG 1517 LANDFILL
19. Township Name ____ Land ID # ____
20. Subdivision Name GREAT LAKES NAVAL BASE Lot # ____
21. Location a. County LAKE
    b. Township ____ Range ____ Section ____
    NORTHING 2057880.8339
    c. ____ Quarter ____ Quarter ____ Quarter
    d. Coordinates Site Elevation ____ ft. (msl) 660.63
    EASTING 1114691.8809
22. Casings, Liners* and Screen Information

For Survey Use

Diam. (in.)	Material	Joint	Slot Size	From (ft.)	To (ft.)
2IN	PVC	THREAD	.010	14.0	4.0

(*) ____
(List reason for liner, type of upper and lower seals installed)

23. Water from ____ at a depth of ____ft. to ____ft.
    a. Static water level ____ ft. below casing which is ____in. above ground
    b. Pumping level is ____ ft. pumping ____gpm after pumping for ____hours

24. Earth Materials Passed Through	From (ft.)	To (ft.)
No. 4 GLOBAL SAND	14.0	3.0
BENTONITE CHIPS	3.0	1.0

(If dry hole, fill out log and indicate how hole was sealed.)

25. Licensed Water Well Contractor Signature License Number

SEE REVERSE SIDE FOR ADDITIONAL INFORMATION)

Illinois Departme[illegible] ublic Health
WATER WELL CONSTRUCTION REPORT

Date MARCH 1 2010

TYPE OR PRESS FIRMLY WITH BLACK INK PEN. COMPLETE WITHIN 30 DAYS OF WELL COMPLETION AND SEND TO THE APPROPRIATE HEALTH DEPARTMENT.

1. Type of Well a. **Driven Well** Casing diam. ____in. Depth ____ft.
   b. **Bored Well** Buried Slab [ ] Yes [ ] No
   Hole Diameter ____in. to ____ft.; ____in. to ____ft. ____in. to ____ft.
   c. **Drilled Well PVC** Casing Formation packer set at depth of N/A ft.
   Hole Diameter 8 1/4 in. to 16 ft. ____in. to ____ft. ____in. to ____ft.

Type of Grout	# of Bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)

d. **Drilled Well Steel Casing**- - - Mechanically Driven [ ] Yes [ ] No
Hole Diameter ____in. to ____ft. ____in. to ____ft. ____in. to ____ft.

Type of Grout	# of Bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)

e. Well finished within [X] Unconsolidated Materials [ ] Bedrock

f. Kind of Gravel Sand Pack

Kind of Gravel Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
GLOBALSILICA	No. #4	16.0	5.0

2. Well Use [ ] Domestic [ ] Irrigation [ ] Commercial [ ] Livestock
   [X] Monitoring [ ] Other
3. Date Well Completed NOV. 13 2009 Well Disinfected [ ] Yes [ ] No
   Driller's estimated well yield ____gpm
4. Date Permanent Pump Installed ____
5. Pump Capacity ____gpm Set at (depth) ____ft.
6. Pitless Adapter Model and Manufacturer ____
7. Well Cap Type and Manufacturer ____
8. Pressure Tank Working Cycle ____gals. Captive Air [ ] Yes [ ] No
9. Pump System Disinfected [ ] Yes [ ] No
10. Name of Pump Company ____
11. Pump Installer ____ License # ____
12. ____ License # ____
    Licensed Pump Contractor Signature

N/A

Illinois Department of Public Health
Division of Environmental Health
525 W. Jefferson St.
Springfield, IL 62761

DO NOT write on these lines

IMPORTANT NOTICE: This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 85-0863. **DISCLOSURE OF THIS INFORMATION IS MANDATORY.** This form has been approved by the Forms Management Center.

GEOLOGICAL AND WATER SURVEY WELL RECORD

13. Property Owner UNITED STATES NAVY Well # NTC21MW02
14. Driller CHRIS WHITE License # ____
15. Name of Drilling Co. TTL ASSOCIATES INC
16. Permit No. ____ Date Issued ____
17. Date Drilling Started NOV. 13 2009
18. Well SITE address 24TH & GREENFIELD BLDG 1517 LANDFILL
19. Township Name ____ Land ID # ____
20. Subdivision Name GREAT LAKES NAVAL BASE Lot # ____
21. Location a. County LAKE
    b. Township ____ Range ____ Section ____
    NORTHING 2057873.4863
    c. ____ Quarter ____ Quarter ____ Quarter
    d. Coordinates ____ Site Elevation ____ ft. (msl)
    EASTING 1115236.5181
22. Casings, Liners* and Screen Information

For Survey Use

Diam. (in.)	Material	Joint	Slot Size	From (ft.)	To (ft.)
2 IN.	PVC	THREAD	.010	16.0	6.0

(*) ____
(List reason for liner, type of upper and lower seals installed)

23. Water from ____ at a depth of ____ft. to ____ft.
    a. Static water level ____ ft. below casing which is ____in. above ground
    b. Pumping level is ____ ft. pumping ____gpm after pumping for ____hours

24. Earth Materials Passed Through

Earth Materials Passed Through	From (ft.)	To (ft.)
No. 4 GLOBAL SAND	16.0	5.0
BENTONITE CHIPS	5.0	1.0

(If dry hole, fill out log and indicate how hole was sealed.)

25. Licensed Water Well Contractor Signature ____ License Number ____

SEE REVERSE SIDE FOR ADDITIONAL INFORMATION)

Illinois Department of Public Health
WATER WELL CONSTRUCTION REPORT

Date MARCH 1 2010

TYPE OR PRESS FIRMLY WITH BLACK INK PEN. COMPLETE WITHIN 30 DAYS OF WELL COMPLETION AND SEND TO THE APPROPRIATE HEALTH DEPARTMENT.

1. Type of Well a. **Driven** Well Casing diam. ______in. Depth ________ft.
   b. **Bored** Well Buried Slab [ ] Yes [ ] No
   Hole Diameter ____in. to ______ft.; ____in. to______ft.; ____in. to______ft.
   c. **Drilled** Well **PVC** casing Formation packer set at depth of N/A ft.
   Hole Diameter 8 1/4 in. to 14 ft. ____in. to______ft. ____in. to______ft.

Type of Grout	# of Bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)

d. **Drilled** Well **Steel** Casing- - - Mechanically Driven [ ] Yes [ ] No
Hole Diameter ____in. to ______ft. ____in. to______ft. ____in. to______ft.

Type of Grout	# of Bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)

e. Well finished within [X] Unconsolidated Materials [ ] Bedrock

f. Kind of Gravel Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
GLOBAL SILICA	#4	14.0	3.0

2. Well Use [ ] Domestic [ ] Irrigation [ ] Commercial [ ] Livestock [X] Monitoring [ ] Other
3. Date Well Completed NOV 14 2009 Well Disinfected [ ] Yes [ ] No
   Driller's estimated well yield __________gpm
4. Date Permanent Pump Installed ______________
5. Pump Capacity __________gpm Set at (depth) __________ft.
6. Pitless Adapter Model and Manufacturer ______________
7. Well Cap Type and Manufacturer ______________
8. Pressure Tank Working Cycle ________gals. Captive Air [ ] Yes [ ] No
9. Pump System Disinfected [ ] Yes [ ] No
10. Name of Pump Company ______________
11. Pump Installer ______________ License # ________
12. ______________ License # ________
    Licensed Pump Contractor Signature

N/A

Illinois Department of Public Health
Division of Environmental Health
525 W. Jefferson St.
Springfield, IL 62761

DO NOT write on these lines

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GEOLOGICAL AND WATER SURVEY WELL RECORD

13. Property Owner UNITED STATES NAVY Well # NTC21 MW03
14. Driller CHRIS WHITE License # ________
15. Name of Drilling Co. TTL ASSOCIATES INC
16. Permit No. ____________ Date Issued ________
17. Date Drilling Started NOV. 14 2009
18. Well **SITE** address 2414 C GREENFIELD BLDG 1517 LANDFILL
19. Township Name ____________ Land ID # ________
20. Subdivision Name GREAT LAKES NAVAL BASE Lot # ________
21. Location a. County LAKE
    b. Township ______ Range ______ Section ______
    NORTHING 2057733.695
    c. ______ Quarter ______ Quarter ______ Quarter
    d. Coordinates ____________ Site Elevation ? ft. (msl)
    EASTING 1115391.7063 653.315

For Survey Use

22. Casings, Liners* and Screen Information

Diam. (in.)	Material	Joint	Slot Size	From (ft.)	To (ft.)
2 IN.	PVC	THREAD	.010	14.0	4.0

(*) ______________________________
(List reason for liner, type of upper and lower seals installed)

23. Water from ______________ at a depth of ________ft. to ________ft.
a. Static water level _____ ft. below casing which is _____in. above ground
b. Pumping level is _____ ft. pumping _____gpm after pumping for _____hours

24. Earth Materials Passed Through	From (ft.)	To (ft.)
No. 4 GLOBAL SAND	14.0	3.0
BENTONITE CHIPS	3.0	1.0

(If dry hole, fill out log and indicate how hole was sealed.)

25. Licensed Water Well Contractor Signature License Number

SEE REVERSE SIDE FOR ADDITIONAL INFORMATION)

Illinois Departme ,blic Health
WATER WELL CONS...CTION REPORT

Date MARCH 1 2010

TYPE OR PRESS FIRMLY WITH BLACK INK PEN. COMPLETE WITHIN 30 DAYS OF WELL COMPLETION AND SEND TO THE APPROPRIATE HEALTH DEPARTMENT.

1. Type of Well a. **Driven** Well Casing diam. ______in. Depth ________ft.
   b. **Bored** Well Buried Slab [ ] Yes [ ] No
   Hole Diameter _____in. to _______ft.; _____in. to_______ft.; _____in. to_______ft.
   c. **Drilled** Well PVC casing Formation packer set at depth of N/A ft.
   Hole Diameter 8 1/4 in. to 20 ft. _____in. to_______ft. _____in. to_______ft.

Type of Grout	# of Bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)

d. **Drilled Well Steel Casing**- - - Mechanically Driven [ ] Yes [ ] No
Hole Diameter _____in. to _______ft. _____in. to_______ft. _____in. to_______ft.

Type of Grout	# of Bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)

e. Well finished within [X] Unconsolidated Materials [ ] Bedrock

f. Kind of Gravel Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
GLOBAL SILICA	#4	20.0	8.0

2. Well Use [ ] Domestic [ ] Irrigation [ ] Commercial [ ] Livestock
   [X] Monitoring [ ] Other
3. Date Well Completed NOV 13 2009 Well Disinfected [ ] Yes [ ] No
   Driller's estimated well yield ____________gpm
4. Date Permanent Pump Installed ____________
5. Pump Capacity ____________gpm Set at (depth) ____________ft.
6. Pitless Adapter Model and Manufacturer ____________
7. Well Cap Type and Manufacturer ____________
8. Pressure Tank Working Cycle ________gals. Captive Air [ ] Yes [ ] No
9. Pump System Disinfected [ ] Yes [ ] No
10. Name of Pump Company ____________
11. Pump Installer ____________ License # ____________
12. ____________ License # ____________
   Licensed Pump Contractor Signature

N/A

Illinois Department of Public Health
Division of Environmental Health
525 W. Jefferson St.
Springfield, IL 62761

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GEOLOGICAL AND WATER SURVEY WELL RECORD

13. Property Owner UNITED STATES NAVY Well # NTC21 MW04
14. Driller CHRIS WHITE License # ____________
15. Name of Drilling Co. TTL ASSOCIATES INC
16. Permit No. ____________ Date Issued ____________
17. Date Drilling Started NOV 13 2009
18. Well SITE address 24TH & GREENFIELD BLDG 1517 LANDFILL
19. Township Name ____________ Land ID # ____________
20. Subdivision Name GREAT LAKES NAVAL BASE Lot # ____________
21. Location a. County LAKE
   b. Township ________ Range ________ Section ________
   NORTHING 2057444.4702
   c. ______ Quarter ______ Quarter ______ Quarter
   d. Coordinates Site Elevation 653.105 ft. (msl)
   EASTING 1115416.4507

For Survey Use

22. Casings, Liners* and Screen Information

Diam. (in.)	Material	Joint	Slot Size	From (ft.)	To (ft.)
2IN	PVC	THREADED	010	20.0	10.0

(*) ____________
(List reason for liner, type of upper and lower seals installed)

23. Water from ____________at a depth of ________ft. to ________ft.
a. Static water level _____ ft. below casing which is _____in. above ground
b. Pumping level is _____ ft. pumping _____gpm after pumping for _____hours

24. Earth Materials Passed Through	From (ft.)	To (ft.)
NO. 4 GLOBAL SAND	20.0	8.0
BENTONITE CHIPS	8.0	1.0

(If dry hole, fill out log and indicate how hole was sealed.)

25. Licensed Water Well Contractor Signature ____________ License Number ____________

SEE REVERSE SIDE FOR ADDITIONAL INFORMATION)

Illinois Department of Public Health
WATER WELL CONSTRUCTION REPORT

Date MARCH 1 2010

TYPE OR PRESS FIRMLY WITH BLACK INK PEN. COMPLETE WITHIN 30 DAYS OF WELL COMPLETION AND SEND TO THE APPROPRIATE HEALTH DEPARTMENT.

1. Type of Well a. **Driven** Well Casing diam. ______in. Depth ________ft.
   b. **Bored** Well Buried Slab [ ] Yes [ ] No
   Hole Diameter _____in. to ______ft.; _____in. to_______ft.; _____in. to_______ft.
   c. **Drilled** Well **PVC** casing Formation packer set at depth of N/A ft.
   Hole Diameter 8 1/4 in. to 13.0 ft. _____in. to_______ft. _____in. to_______ft.

Type of Grout	# of Bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)

   d. **Drilled** Well **Steel** Casing- - - Mechanically Driven [ ] Yes [ ] No
   Hole Diameter _____in. to ______ft. _____in. to______ft. _____in. to______ft.

Type of Grout	# of Bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)

   e. Well finished within [X] Unconsolidated Materials [ ] Bedrock

f. Kind of Gravel Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
GLOBAL SILICA	#4	13.0	2.0

2. Well Use [ ] Domestic [ ] Irrigation [ ] Commercial [ ] Livestock
   [X] Monitoring [ ] Other
3. Date Well Completed NOV.14 2009 Well Disinfected [ ] Yes [ ] No
   Driller's estimated well yield ____________gpm
4. Date Permanent Pump Installed ________________
5. Pump Capacity __________gpm Set at (depth) ___________ft.
6. Pitless Adapter Model and Manufacturer ____________________
7. Well Cap Type and Manufacturer ____________________
8. Pressure Tank Working Cycle________gals. Captive Air [ ] Yes [ ] No
9. Pump System Disinfected [ ] Yes [ ] No
10. Name of Pump Company ____________________

N/A

11. Pump Installer ____________________ License # __________
12. ____________________ License # __________
   Licensed Pump Contractor Signature

Illinois Department of Public Health
Division of Environmental Health
525 W. Jefferson St.
Springfield, IL 62761

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GEOLOGICAL AND WATER SURVEY WELL RECORD

13. Property Owner UNITED STATES NAVY Well # NTC21MW05
14. Driller CHRIS WHITE License # __________
15. Name of Drilling Co. TTL ASSOCIATES INC
16. Permit No. ____________ Date Issued __________
17. Date Drilling Started NOV 14 2009
18. Well SITE address 24TH & GREENFIELD BLDG 1517 LANDFILL
19. Township Name ____________ Land ID # __________
20. Subdivision Name GREAT LAKES NAVAL BASE Lot # __________
21. Location a. County LAKE
   b. Township ______ Range ______ Section ______
   NORTHING 2057518.8101
   c. ______ Quarter ______ Quarter ______ Quarter
   d. Coordinates ____________ Site Elevation ? ft. (msl)
   EASTING 1115138.923
   655.28

For Survey Use

22. Casings, Liners* and Screen Information

Diam. (in.)	Material	Joint	Slot Size	From (ft.)	To (ft.)
2IN	PVC	THREAD	.010	13.0	3.0

(*) ____________________
(List reason for liner, type of upper and lower seals installed)

23. Water from ______________at a depth of ________ft. to ________ft.
   a. Static water level _____ ft. below casing which is _____in. above ground
   b. Pumping level is _____ ft. pumping _____gpm after pumping for _____hours

24. Earth Materials Passed Through	From (ft.)	To (ft.)
No. 4 GLOBAL SAND	13.0	2.0
BENTONITE CHIPS	2.0	1.0

(If dry hole, fill out log and indicate how hole was sealed.)

25. Licensed Water Well Contractor Signature ____________ License Number ____________

SEE REVERSE SIDE FOR ADDITIONAL INFORMATION)

Illinois Departme   ıblic Health
WATER WELL CONS.   .CTION REPORT

Date MARCH 1 2010

TYPE OR PRESS FIRMLY WITH BLACK INK PEN. COMPLETE WITHIN 30 DAYS OF WELL COMPLETION AND SEND TO THE APPROPRIATE HEALTH DEPARTMENT.

1. Type of Well a. **Driven Well** Casing diam. ______in. Depth ________ft.
   b. **Bored** Well Buried Slab [ ] Yes [ ] No
   Hole Diameter _____in. to ______ft.; _____in. to_______ft.; _____in. to_______ft.
   c. **Drilled** Well **PVC** casing Formation packer set at depth of N/A ft.
   Hole Diameter 8 1/4 in. to 14.0 ft. _____in. to_______ft. _____in. to_______ft.

Type of Grout	# of Bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)

d. **Drilled** Well **Steel** Casing- - - Mechanically Driven [ ] Yes [ ] No
Hole Diameter _____in. to ______ft. _____in. to______ft. _____in. to______ft.

Type of Grout	# of Bags	Grout Weight	From (ft.)	To (ft.)	Tremie Depth (ft.)

e. Well finished within [X] Unconsolidated Materials [ ] Bedrock

f. Kind of Gravel Sand Pack

Kind of Gravel Sand Pack	Grain Size/Supplier #	From (ft.)	To (ft.)
GLOBALSILICA	#4	14.0	3.0

2. Well Use [ ] Domestic [ ] Irrigation [ ] Commercial [ ] Livestock
   [X] Monitoring [ ] Other
3. Date Well Completed NOV. 14 2009 Well Disinfected [ ] Yes [ ] No
   Driller's estimated well yield ___________gpm
4. Date Permanent Pump Installed _______________
5. Pump Capacity __________gpm Set at (depth) __________ft.
6. Pitless Adapter Model and Manufacturer _______________
7. Well Cap Type and Manufacturer _______________
8. Pressure Tank Working Cycle________gals. Captive Air [ ] Yes [ ] No
9. Pump System Disinfected [ ] Yes [ ] No
10. Name of Pump Company _______________
11. Pump Installer _______________ License # ___________
12. _______________ License # ___________
    Licensed Pump Contractor Signature

N/A

Illinois Department of Public Health
Division of Environmental Health
525 W. Jefferson St.
Springfield, IL 62761

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GEOLOGICAL AND WATER SURVEY WELL RECORD

13. Property Owner UNITED STATES NAVY Well # NTC21MW06
14. Driller CHRIS WHITE License # ___________
15. Name of Drilling Co. TTL ASSOCIATES INC
16. Permit No. ___________ Date Issued ___________
17. Date Drilling Started NOV. 14 2009
18. Well SITE address SPALDING ST @ 24TH BLDG 1517 LANDFILL
19. Township Name ___________ Land ID # ___________
20. Subdivision Name GREAT LAKES NAVAL BASE Lot # ___________
21. Location a. County LAKE
    b. Township ______ Range ______ Section ______
    c. ____ Quarter ____ Quarter ____ Quarter
    NORTHING 2057503.8066
    d. Coordinates ______ Site Elevation ? ft. (msl)
    EASTING 1114703.354
22. Casings, Liners* and Screen Information 659.53

For Survey Use

Diam. (in.)	Material	Joint	Slot Size	From (ft.)	To (ft.)
2IN	PVC	THREAD	.010	14.0	4.0

(*) _______________
(List reason for liner, type of upper and lower seals installed)

23. Water from _______________at a depth of ________ft. to ________ft.
    a. Static water level _____ ft. below casing which is _____in. above ground
    b. Pumping level is _____ ft. pumping _____gpm after pumping for _____hours

24. Earth Materials Passed Through

Earth Materials Passed Through	From (ft.)	To (ft.)
No.4 GLOBALSAND	14.0	3.0
BENTONITE CHIPS	3.0	1.0

(If dry hole, fill out log and indicate how hole was sealed.)

25. Licensed Water Well Contractor Signature License Number

SEE REVERSE SIDE FOR ADDITIONAL INFORMATION)

Tetra Tech NUS, Inc.

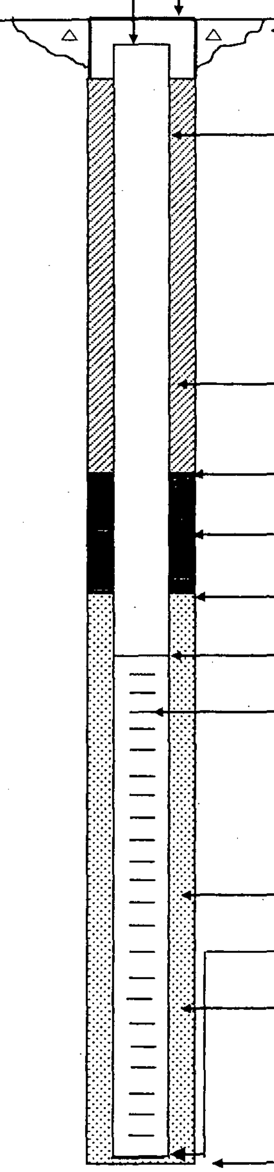
MONITORING WELL SHEET

WELL No.: NTC21MW01

PERMIT No:

PROJECT:	NAVSTA Great Lakes	DRILLING Co.:	TTL	BORING No.:	NTC21SB02
PROJECT No.:	112G01797	DRILLER:	C. White	DATE COMPLETED:	11/13/09
SITE:	NTC21	DRILLING METHOD:	Hollow Stem Auger	NORTHING:	2057880.8339
GEOLOGIST:	J. Ferguson	DEV. METHOD:	Submersible pump	EASTING:	1114691.8809

Ground Elevation Datum: 660.63



Not to Scale

Elevation / Depth of Top of Riser: 660.37 / 0.265'

Elevation / Height of Top of Surface Casing: 660.63 / 0.0'

I.D. of Surface Casing: 6"

Type of Surface Casing: FLUSH MOUNT

Type of Surface Seal: CONCRETE

I.D. of Riser: 2"

Type of Riser: Schedule 40 PVC

Borehole Diameter: 8.25"

Type of Backfill: Cetco Holeplug - granular bentonite

Elevation / Depth of Seal: 659.37 / 1'

Type of Seal: Bentonite pellet

Elevation / Depth of Top of Filter Pack: 657.37 / 3'

Elevation / Depth of Top of Screen: 556.37 / 4'

Type of Screen: PVC

Slot Size x Length: 0.010 SLOT, 10'

I.D. of Screen: 2"

Type of Filter Pack: No. 4 Global Silica

Elevation / Depth of Bottom of Screen: 646.37 / 14'

Elevation / Depth of Bottom of Filter Pack: 646.37 / 14'

Type of Backfill Below Well: NA

Elevation / Total Depth of Borehole: 646.37 / 14'

Tetra Tech NUS, Inc.

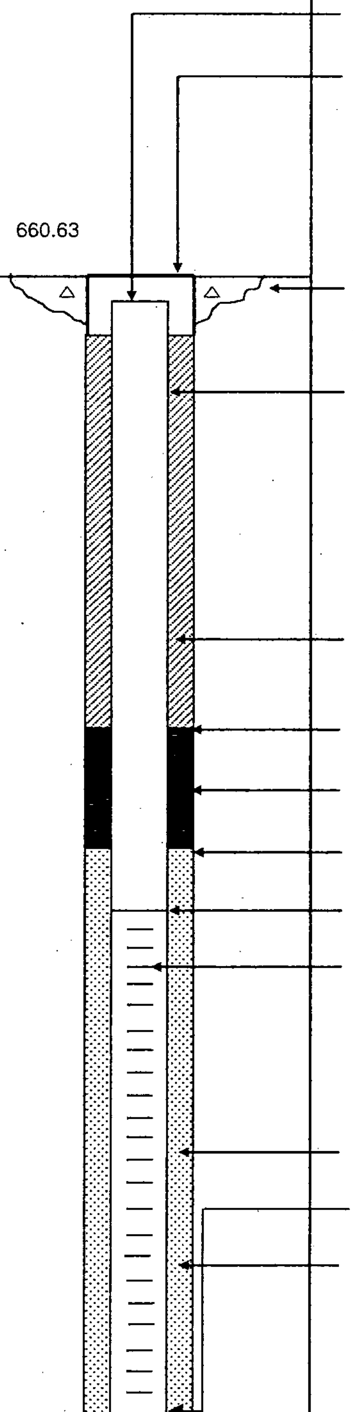
MONITORING WELL SHEET

WELL No.: NTC21MW01

PERMIT No:

PROJECT:	NAVSTA Great Lakes	DRILLING Co.:	TTL	BORING No.:	NTC21SB02
PROJECT No.:	112G01797	DRILLER:	C. White	DATE COMPLETED:	11/13/09
SITE:	NTC21	DRILLING METHOD:	Hollow Stem Auger	NORTHING:	2057880.8339
GEOLOGIST:	J. Ferguson	DEV. METHOD:	Submersible pump	EASTING:	1114691.8809

Ground Elevation Datum: 660.63



Not to Scale

Elevation / Depth of Top of Riser:		660.37 / 0.265'
Elevation / Height of Top of Surface Casing:		660.63 / 0.0'
I.D. of Surface Casing:	6"	
Type of Surface Casing:	FLUSH MOUNT	
Type of Surface Seal:	CONCRETE	
I.D. of Riser:	2"	
Type of Riser:	Schedule 40 PVC	
Borehole Diameter:	8.25"	
Type of Backfill:	Cetco Holeplug - granular bentonite	
Elevation / Depth of Seal:		659.37 / 1'
Type of Seal:	Bentonite pellet	
Elevation / Depth of Top of Filter Pack:		657.37 / 3'
Elevation / Depth of Top of Screen:		556.37 / 4'
Type of Screen:	PVC	
Slot Size x Length:	0.010 SLOT, 10'	
I.D. of Screen:	2"	
Type of Filter Pack:	No. 4 Global Silica	
Elevation / Depth of Bottom of Screen:		646.37 / 14'
Elevation / Depth of Bottom of Filter Pack:		646.37 / 14'
Type of Backfill Below Well:	NA	
Elevation / Total Depth of Borehole:		646.37 / 14'

Tetra Tech NUS, Inc.

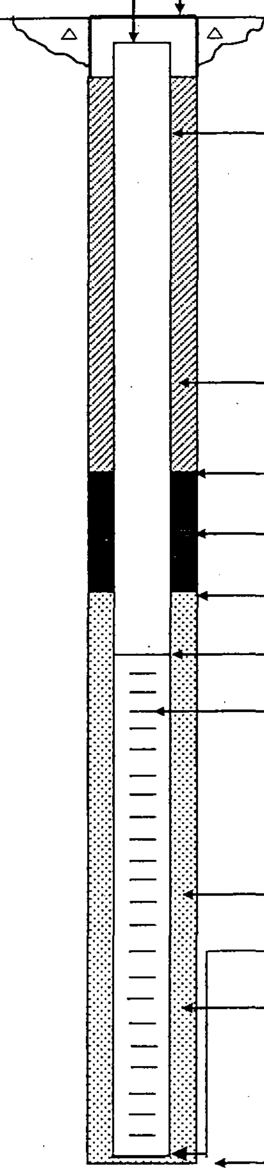
WELL No.: NTC21MW02

MONITORING WELL SHEET

PERMIT No:

PROJECT:	NAVSTA Great Lakes	DRILLING Co.:	TTL	BORING No.:	NTC21SB04
PROJECT No.:	112G01797	DRILLER:	C. White	DATE COMPLETED:	11/13/09
SITE:	NTC21	DRILLING METHOD:	Hollow Stem Auger	NORTHING:	2057873.4863
GEOLOGIST:	J. Ferguson	DEV. METHOD:	Submersible pump	EASTING:	1115236.5181

Ground Elevation Datum: 654.245



Not to Scale

Elevation / Depth of Top of Riser: 653.66 / 0.585'

Elevation / Height of Top of Surface Casing: 654.25 / 0.0'

I.D. of Surface Casing: 6"

Type of Surface Casing: FLUSH MOUNT

Type of Surface Seal: CONCRETE

I.D. of Riser: 2"

Type of Riser: Schedule 40 PVC

Borehole Diameter: 8.25"

Type of Backfill: Cetco Holeplug - granular bentonite

Elevation / Depth of Seal: 652.66 / 1'

Type of Seal: Bentonite pellet

Elevation / Depth of Top of Filter Pack: 648.66 / 5'

Elevation / Depth of Top of Screen: 647.66 / 6'

Type of Screen: PVC

Slot Size x Length: 0.010 SLOT, 10'

I.D. of Screen: 2"

Type of Filter Pack: No. 4 Global Silica

Elevation / Depth of Bottom of Screen: 637.66 / 16'

Elevation / Depth of Bottom of Filter Pack: 637.66 / 16'

Type of Backfill Below Well: NA

Elevation / Total Depth of Borehole: 637.66 / 16'

Tetra Tech NUS, Inc.

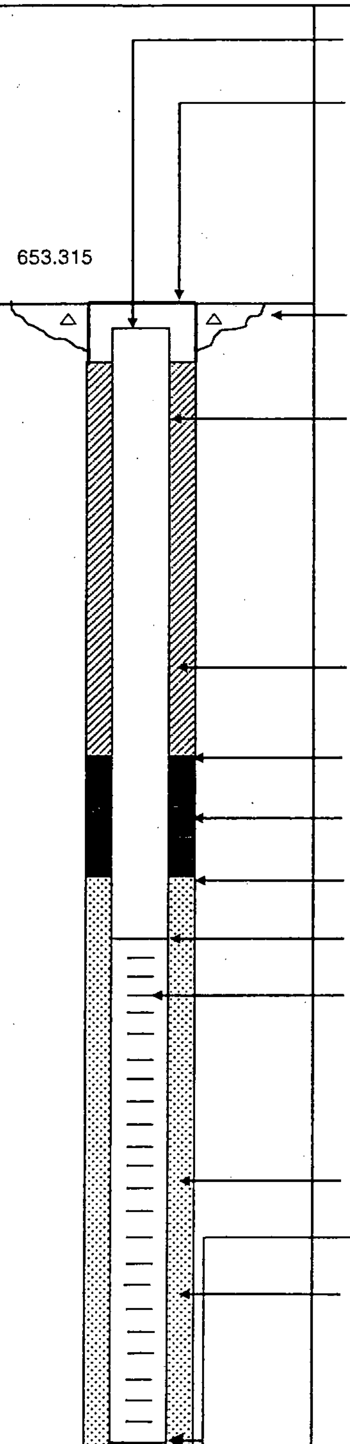
WELL No.: NTC21MW03

MONITORING WELL SHEET

PERMIT No:

PROJECT:	NAVSTA Great Lakes	DRILLING Co.:	TTL	BORING No.:	NTC21SB05
PROJECT No.:	112G01797	DRILLER:	C. White	DATE COMPLETED:	11/14/09
SITE:	NTC21	DRILLING METHOD:	Hollow Stem Auger	NORTHING:	2057733.695
GEOLOGIST:	J. Ferguson	DEV. METHOD:	Submersible pump	EASTING:	1115391.7063

Ground Elevation Datum: 653.315



Not to Scale

Elevation / Depth of Top of Riser:	652.83 / 0.49'
Elevation / Height of Top of Surface Casing:	653.32 / 0.0'
I.D. of Surface Casing:	6"
Type of Surface Casing:	FLUSH MOUNT
Type of Surface Seal:	CONCRETE
I.D. of Riser:	2"
Type of Riser:	Schedule 40 PVC
Borehole Diameter:	8.25"
Type of Backfill:	Cetco Holeplug - granular bentonite
Elevation / Depth of Seal:	651.83 / 1'
Type of Seal:	Bentonite pellet
Elevation / Depth of Top of Filter Pack:	649.83 / 3'
Elevation / Depth of Top of Screen:	648.83 / 4'
Type of Screen:	PVC
Slot Size x Length:	0.010 SLOT, 10'
I.D. of Screen:	2"
Type of Filter Pack:	No. 4 Global Silica
Elevation / Depth of Bottom of Screen:	638.83 / 14'
Elevation / Depth of Bottom of Filter Pack:	638.83 / 14'
Type of Backfill Below Well:	NA
Elevation / Total Depth of Borehole:	638.83 / 14'

Tetra Tech NUS, Inc.

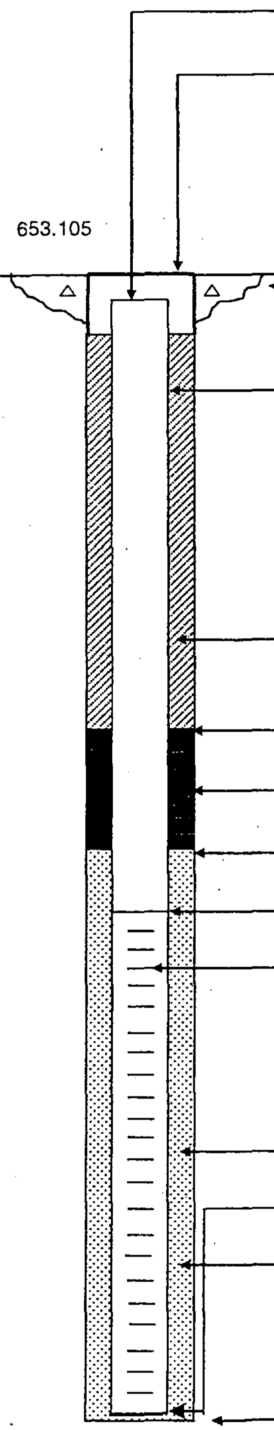
WELL No.: NTC21MW04

MONITORING WELL SHEET

PERMIT No:

PROJECT:	NAVSTA Great Lakes	DRILLING Co.:	TTL	BORING No.:	NTC21SB08
PROJECT No.:	112G01797	DRILLER:	C. White	DATE COMPLETED:	11/13/09
SITE:	NTC21	DRILLING METHOD:	Hollow Stem Auger	NORTHING:	2057444.4702
GEOLOGIST:	J. Ferguson	DEV. METHOD:	Submersible pump	EASTING:	1115416.4507

Ground Elevation Datum: 653.105



Not to Scale

Elevation / Depth of Top of Riser:		652.74 / 0.37
Elevation / Height of Top of Surface Casing:		653.11 / 0.0'
I.D. of Surface Casing:	6"	
Type of Surface Casing:	FLUSH MOUNT	
Type of Surface Seal:	CONCRETE	
I.D. of Riser:	2"	
Type of Riser:	Schedule 40 PVC	
Borehole Diameter:	8.25"	
Type of Backfill:	Cetco Holeplug - granular bentonite	
Elevation / Depth of Seal:		651.74 / 1'
Type of Seal:	Bentonite pellet	
Elevation / Depth of Top of Filter Pack:		644.74 / 8'
Elevation / Depth of Top of Screen:		642.74 / 10.0
Type of Screen:	PVC	
Slot Size x Length:	0.010 SLOT, 10'	
I.D. of Screen:	2"	
Type of Filter Pack:	No. 4 Global Silica	
Elevation / Depth of Bottom of Screen:		632.74 / 20'
Elevation / Depth of Bottom of Filter Pack:		632.74 / 20'
Type of Backfill Below Well:	NA	
Elevation / Total Depth of Borehole:		632.74 / 20'

Tetra Tech NUS, Inc.

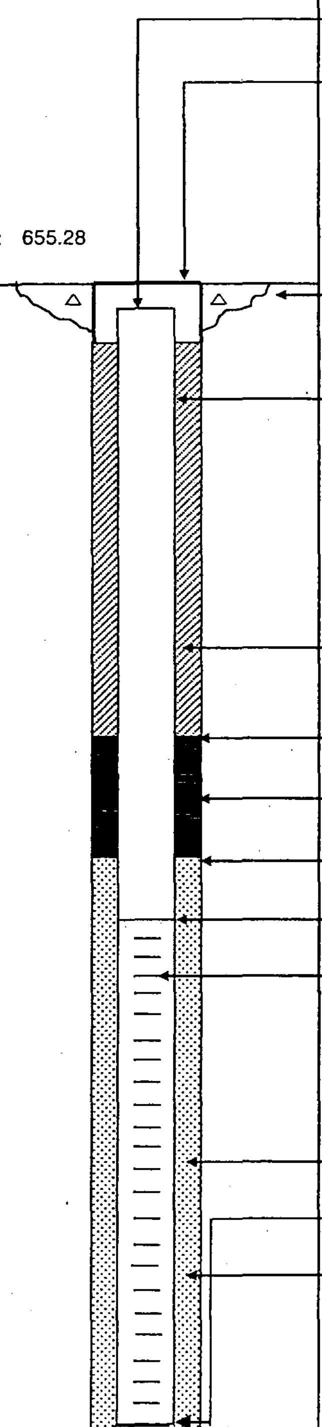
WELL No.: NTC21MW05

MONITORING WELL SHEET

PERMIT No:

PROJECT: NAVSTA Great Lakes		DRILLING Co.:	TTL	BORING No.:	NTC21SB22
PROJECT No.:	112G01797	DRILLER:	C. White	DATE COMPLETED:	11/14/09
SITE:	NTC21	DRILLING METHOD:	Hollow Stem Auger	NORTHING:	2057518.8101
GEOLOGIST:	J. Ferguson	DEV. METHOD:	Submersible pump	EASTING:	1115138.923

Ground Elevation Datum: 655.28



Not to Scale

Elevation / Depth of Top of Riser: 655.03 / 0.25

Elevation / Height of Top of Surface Casing: 655.28 / 0.0'

I.D. of Surface Casing: 6"

Type of Surface Casing: FLUSH MOUNT

Type of Surface Seal: CONCRETE

I.D. of Riser: 2"

Type of Riser: Schedule 40 PVC

Borehole Diameter: 8.25"

Type of Backfill: Cetco Holeplug - granular bentonite

Elevation / Depth of Seal: 654.03 / 1'

Type of Seal: Bentonite pellet

Elevation / Depth of Top of Filter Pack: 653.03 / 2'

Elevation / Depth of Top of Screen: 652.03 / 3'

Type of Screen: PVC

Slot Size x Length: 0.010 SLOT, 10'

I.D. of Screen: 2"

Type of Filter Pack: No. 4 Global Silica

Elevation / Depth of Bottom of Screen: 642.03 / 13'

Elevation / Depth of Bottom of Filter Pack: 642.03 / 13'

Type of Backfill Below Well: NA

Elevation / Total Depth of Borehole: 642.03 / 13'

Tetra Tech NUS, Inc.

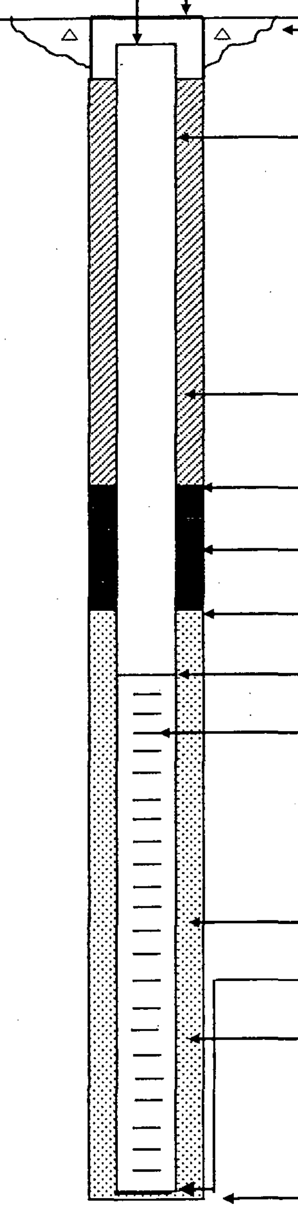
MONITORING WELL SHEET

WELL No.: NTC21MW06

PERMIT No:

PROJECT:	NAVSTA Great Lakes	DRILLING Co.:	TTL	BORING No.:	NTC21SB18
PROJECT No.:	112G01797	DRILLER:	C. White	DATE COMPLETED:	11/14/09
SITE:	NTC21	DRILLING METHOD:	Hollow Stem Auger	NORTHING:	2057503.8066
GEOLOGIST:	J. Ferguson	DEV. METHOD:	Submersible pump	EASTING:	1114703.354

Ground Elevation Datum: 659.53



Not to Scale

Elevation / Depth of Top of Riser: 659.17 / 0.36'

Elevation / Height of Top of Surface Casing: 659.53 / 0.0'

I.D. of Surface Casing: 6"

Type of Surface Casing: FLUSH MOUNT

Type of Surface Seal: CONCRETE

I.D. of Riser: 2"

Type of Riser: Schedule 40 PVC

Borehole Diameter: 8.25"

Type of Backfill: Cetco Holeplug - granular bentonite

Elevation / Depth of Seal: 658.17 / 1'

Type of Seal: Bentonite pellet

Elevation / Depth of Top of Filter Pack: 656.17 / 3'

Elevation / Depth of Top of Screen: 655.17 / 4'

Type of Screen: PVC

Slot Size x Length: 0.010 SLOT, 10'

I.D. of Screen: 2"

Type of Filter Pack: No. 4 Global Silica

Elevation / Depth of Bottom of Screen: 645.17 / 14'

Elevation / Depth of Bottom of Filter Pack: 645.17 / 14'

Type of Backfill Below Well: NA

Elevation / Total Depth of Borehole: 645.17 / 14'

B-5 SLUG TEST DATA

GREAT LAKES NAVAL STATION 112G01489
NTC21-MW01 RISING HEAD SLUG TEST
Bouwer and Rice Method

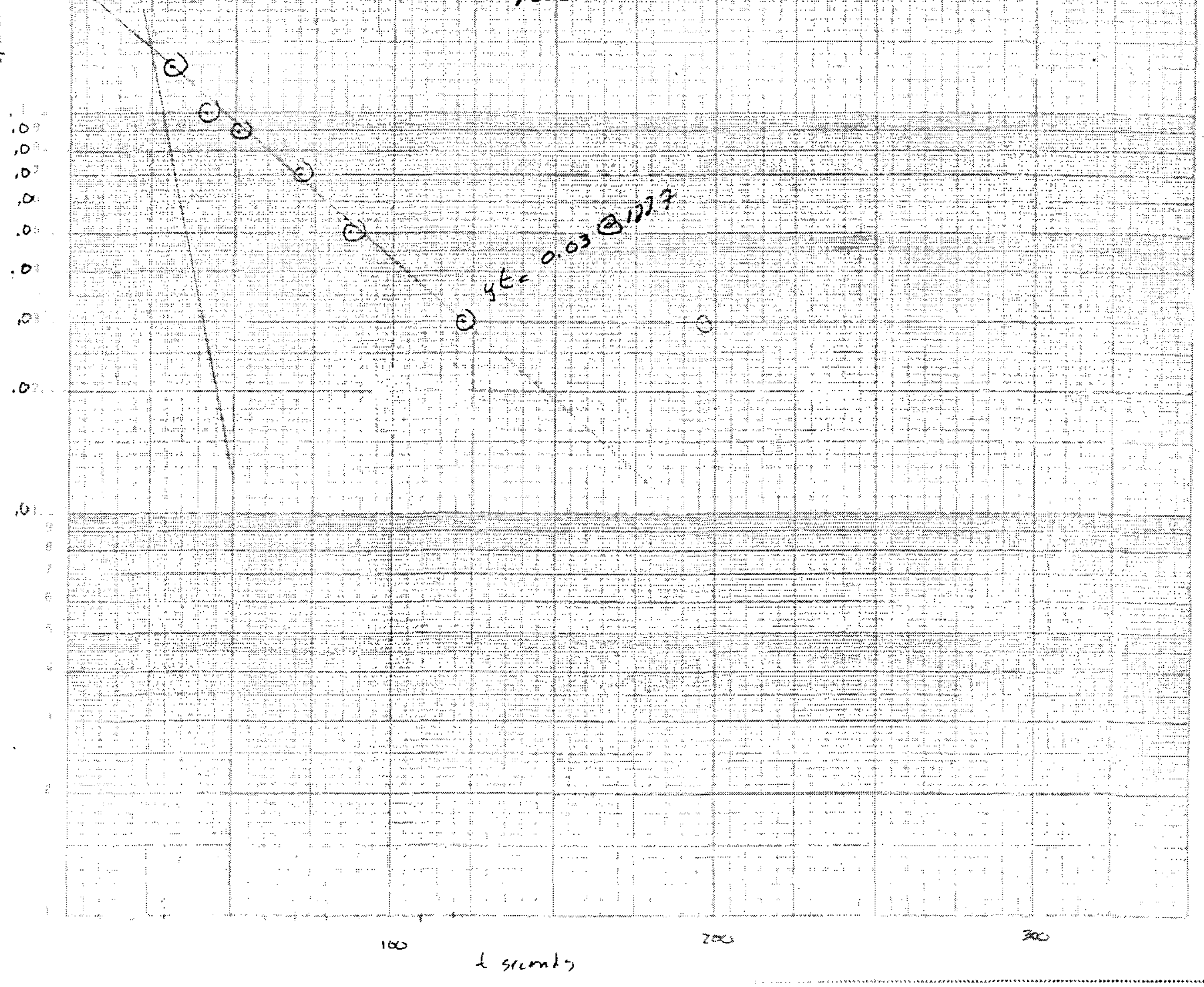
$$Ln\ R_e/r_w = \left[\frac{1.1}{Ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1} = \left[\frac{1.1}{Ln\left(\frac{8.64}{0.34375}\right)} + \frac{1.75}{25.13}\right] = \left[\frac{1.1}{3.22} + 0.069\right]^{-1} =$$

$$= \frac{1}{.411} = 2.43$$

$$K_c = \frac{(r_c^2)(Ln\ R_e/r_w)}{2(L_e)} \cdot \frac{1}{t} \cdot \frac{y_0}{y_t} = \frac{(0.083^2)(2.43)}{2(8.64)}\left(\frac{1}{1227}\right)\left(\frac{2.15}{0.03}\right)$$

$$= \left(\frac{0.17}{17.28}\right)(0.0081)(71.66) = (0.0098)(.580)$$

$$= 5.7 \times 10^{-3}\ ft/sec \quad or \quad 1.73 \times 10^{-3}\ cm/sec$$



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In-Situ Inc.	MiniTroll Pro		
Report generated:		11/19/2009	12:15:28
Report from file:	...\SN13334 2009-11-18 085500 NTC21 MW01.bin		
Win-Situ Version		4.47	
Serial number:		13334	
Firmware Version		3.09	
Unit name:	NTC21-MW01		
Test name:		NTC21 MW01	
Test defined on:		11/18/2009	8:50:22
Test scheduled for:		11/18/2009	8:55:00
Test started on:		11/18/2009	8:55:00
Test stopped on:		11/18/2009	9:02:02
Test extracted on:	N/A	N/A	
Data gathered using Logarithmic testing			
Maximum time between data points:	Seconds.		
Number of data samples:		95	
TOTAL DATA SAMPLES		95	
Channel number [2]			
Measurement type:	Pressure		
Channel name:	OnBoard Pressure		
Sensor Range:	30 PSIG.		
Specific gravity:		1	
Mode:	Surface		
User-defined reference:		0 Feet H2O	
Referenced on:	test start		
Pressure head at reference:		8.043 Feet H2O	

Monitoring Well	Northing	Easting	Elevation Top of PVC	Existing Ground Elevation	Total Depth	Screen Depth	Screen Elevation	Sandpack Depth	Sandpack Elevation
NTC21-MW01	2057880.83	1114691.88	660.37	660.63	14.00	4.00 - 14.00	656.37 - 646.37	3.00 - 14.00	657.37 - 646.37

Date	Time	ET (sec)	Chan[2] Feet H2O
11/18/2009	8:55:00	0	0
11/18/2009	8:55:00	0.3	-0.007
11/18/2009	8:55:00	0.6	0.005
11/18/2009	8:55:00	0.9	-0.003
11/18/2009	8:55:01	1.2	0.013
11/18/2009	8:55:01	1.5	-0.002
11/18/2009	8:55:01	1.8	0.015
11/18/2009	8:55:02	2.1	-1.122

Date	Time	ET (sec)	Drawdown	ET (sec)	Drawdown
11/18/2009	8:55:02	2.4	-1.543	0	1.543
11/18/2009	8:55:03	3	-1.505	0.6	1.51
11/18/2009	8:55:03	3.3	-1.459	0.9	1.46
11/18/2009	8:55:03	3.6	-1.371	1.2	1.37
11/18/2009	8:55:03	3.9	-1.36	1.5	1.36
11/18/2009	8:55:04	4.2	-1.362	1.8	1.36
11/18/2009	8:55:04	4.5	-1.333	2.1	1.33
11/18/2009	8:55:04	4.8	-1.295	2.4	1.30
11/18/2009	8:55:05	5.1	-1.253	2.7	1.25
11/18/2009	8:55:05	5.4	-1.213	3	1.21
11/18/2009	8:55:05	5.7	-1.186	3.3	1.19
11/18/2009	8:55:06	6	-1.155	3.6	1.16
11/18/2009	8:55:06	6.4	-1.119	4	1.12
11/18/2009	8:55:06	6.7	-1.083	4.3	1.08
11/18/2009	8:55:07	7.1	-1.047	4.7	1.05
11/18/2009	8:55:07	7.5	-1.007	5.1	1.01
11/18/2009	8:55:07	8	-0.984	5.6	0.98
11/18/2009	8:55:08	8.4	-0.925	6	0.93
11/18/2009	8:55:08	8.9	-0.869	6.5	0.87
11/18/2009	8:55:09	9.5	-0.827	7.1	0.83
11/18/2009	8:55:10	10	-0.788	7.6	0.79
11/18/2009	8:55:10	10.6	-0.746	8.2	0.75
11/18/2009	8:55:11	11.3	-0.7	8.9	0.70
11/18/2009	8:55:11	11.9	-0.651	9.5	0.65
11/18/2009	8:55:12	12.6	-0.605	10.2	0.61
11/18/2009	8:55:13	13.4	-0.573	11	0.57
11/18/2009	8:55:14	14.2	-0.508	11.8	0.51
11/18/2009	8:55:15	15	-0.496	12.6	0.50
11/18/2009	8:55:15	15.9	-0.428	13.5	0.43
11/18/2009	8:55:16	16.8	-0.367	14.4	0.37
11/18/2009	8:55:17	17.8	-0.323	15.4	0.32
11/18/2009	8:55:18	18.9	-0.296	16.5	0.30
11/18/2009	8:55:20	20	-0.287	17.6	0.29
11/18/2009	8:55:21	21.2	-0.241	18.8	0.24
11/18/2009	8:55:22	22.4	-0.22	20	0.22
11/18/2009	8:55:23	23.8	-0.195	21.4	0.20
11/18/2009	8:55:25	25.2	-0.165	22.8	0.17
11/18/2009	8:55:26	26.7	-0.167	24.3	0.17
11/18/2009	8:55:28	28.2	-0.157	25.8	0.16
11/18/2009	8:55:29	29.8	-0.146	27.4	0.15
11/18/2009	8:55:31	31.5	-0.14	29.1	0.14
11/18/2009	8:55:33	33.3	-0.132	30.9	0.13

11/18/2009	8:55:35	35.2	-0.127	32.8	0.13
11/18/2009	8:55:37	37.3	-0.119	34.9	0.12
11/18/2009	8:55:39	39.5	-0.115	37.1	0.12
11/18/2009	8:55:41	41.8	-0.108	39.4	0.11
11/18/2009	8:55:44	44.3	-0.104	41.9	0.10
11/18/2009	8:55:46	46.9	-0.083	44.5	0.08
11/18/2009	8:55:49	49.7	-0.083	47.3	0.08
11/18/2009	8:55:52	52.6	-0.093	50.2	0.09
11/18/2009	8:55:55	55.7	-0.087	53.3	0.09
11/18/2009	8:55:58	59	-0.066	56.6	0.07
11/18/2009	8:56:02	62.5	-0.062	60.1	0.06
11/18/2009	8:56:06	66.2	-0.06	63.8	0.06
11/18/2009	8:56:10	70.1	-0.055	67.7	0.06
11/18/2009	8:56:14	74.3	-0.07	71.9	0.07
11/18/2009	8:56:18	78.7	-0.066	76.3	0.07
11/18/2009	8:56:23	83.4	-0.066	81	0.07
11/18/2009	8:56:28	88.4	-0.047	86	0.05
11/18/2009	8:56:33	93.7	-0.061	91.3	0.06
11/18/2009	8:56:39	99.3	-0.057	96.9	0.06
11/18/2009	8:56:45	105.2	-0.057	102.8	0.06
11/18/2009	8:56:51	111.5	-0.053	109.1	0.05
11/18/2009	8:56:58	118.1	-0.051	115.7	0.05
11/18/2009	8:57:05	125.1	-0.034	122.7	0.03
11/18/2009	8:57:12	132.6	-0.032	130.2	0.03
11/18/2009	8:57:20	140.5	-0.048	138.1	0.05
11/18/2009	8:57:28	148.9	-0.048	146.5	0.05
11/18/2009	8:57:37	157.8	-0.048	155.4	0.05
11/18/2009	8:57:47	167.2	-0.065	164.8	0.07
11/18/2009	8:57:57	177.2	-0.029	174.8	0.03
11/18/2009	8:58:07	187.8	-0.032	185.4	0.03
11/18/2009	8:58:18	199	-0.032	196.6	0.03
11/18/2009	8:58:30	210.9	-0.048	208.5	0.05
11/18/2009	8:58:43	223.5	-0.029	221.1	0.03
11/18/2009	8:58:56	236.8	-0.04	234.4	0.04
11/18/2009	8:59:10	250.9	-0.046	248.5	0.05
11/18/2009	8:59:25	265.8	-0.032	263.4	0.03
11/18/2009	8:59:41	281.6	-0.033	279.2	0.03
11/18/2009	8:59:58	298.4	-0.046	296	0.05
11/18/2009	9:00:16	316.2	-0.046	313.8	0.05
11/18/2009	9:00:34	335	-0.063	332.6	0.06
11/18/2009	9:00:54	354.9	-0.046	352.5	0.05
11/18/2009	9:01:15	376	-0.027	373.6	0.03
11/18/2009	9:01:38	398.4	-0.029	396	0.03
11/18/2009	9:02:02	422.1	-0.031	419.7	0.03

Client: Great Lakes Naval Station

Project: NTC21 MW01

Project No.: 112601489

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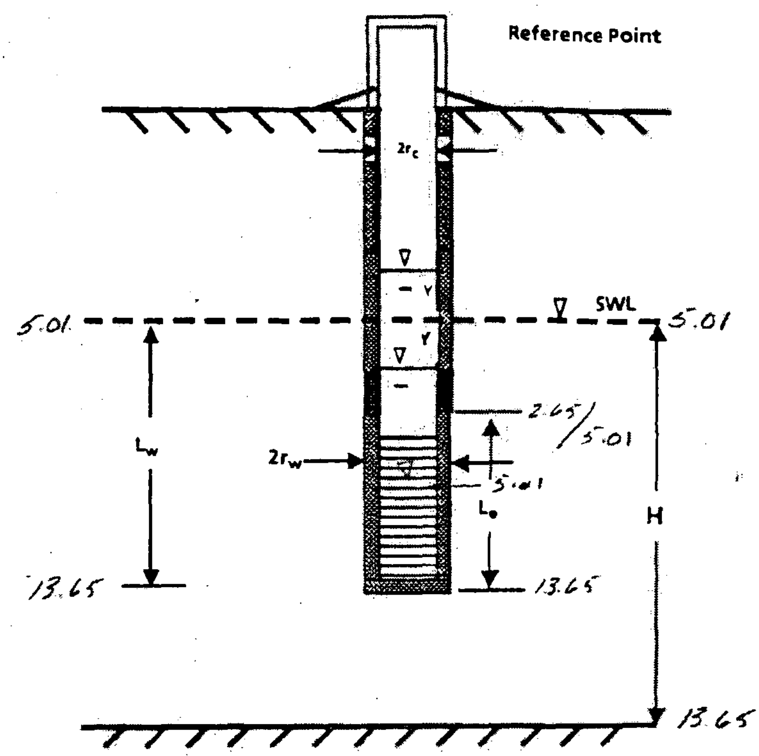
Schematic of Geometry and Boundary Conditions for a Screened Well

MW# MW01

Drawdown
-or-
Recovery Test
(circle)

H = 13.65 - 5.01 = 8.64
L_w = 8.64
L_e = 8.64
r_w = 0.34375
r_c = 0.083
L_e/r_w = 25.13

∴ A = ____, B = ____, or C = 1.75



Relatively Impermeable Material

Known/Assume @ 13.65 feet
(circle)

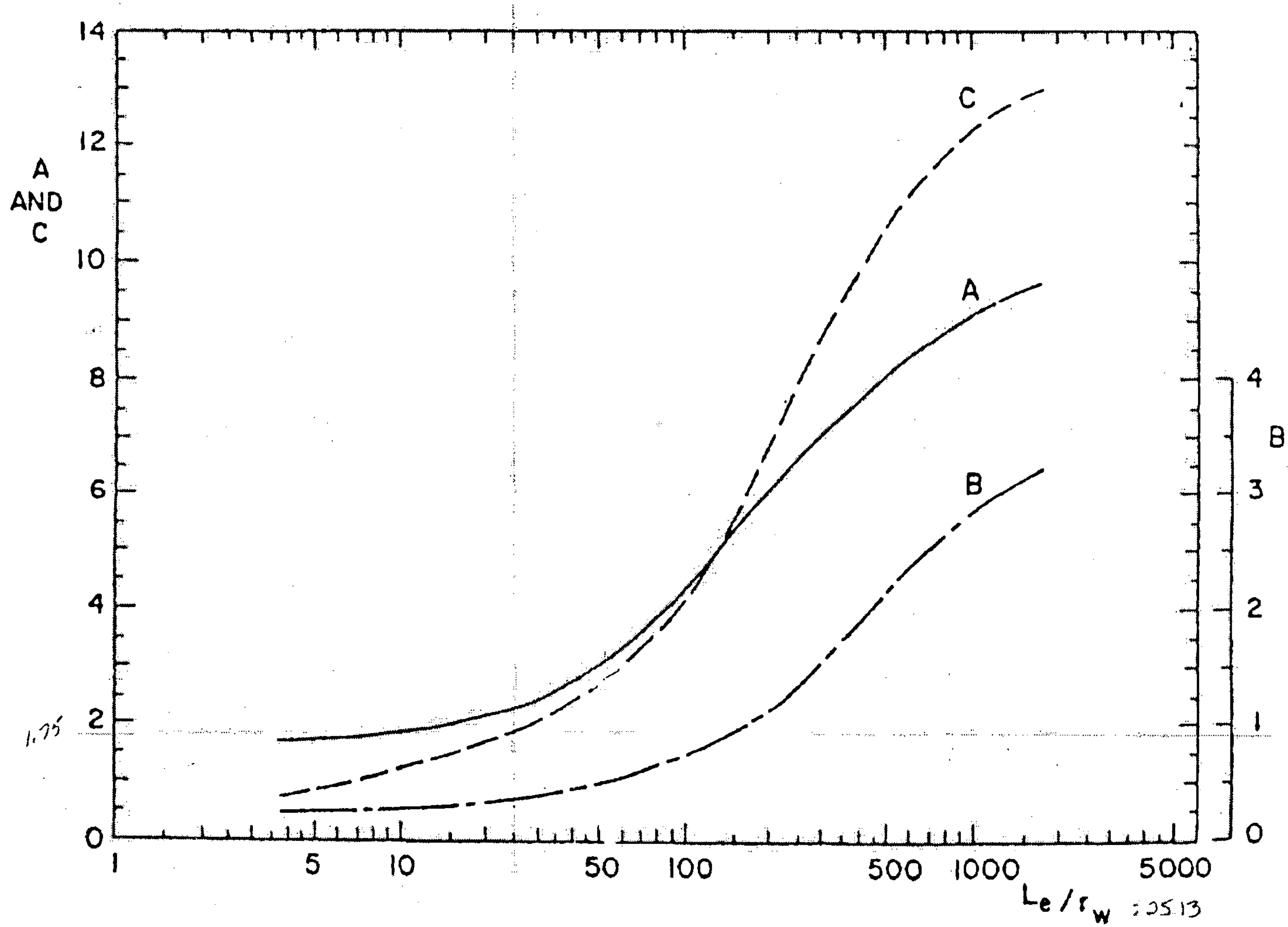
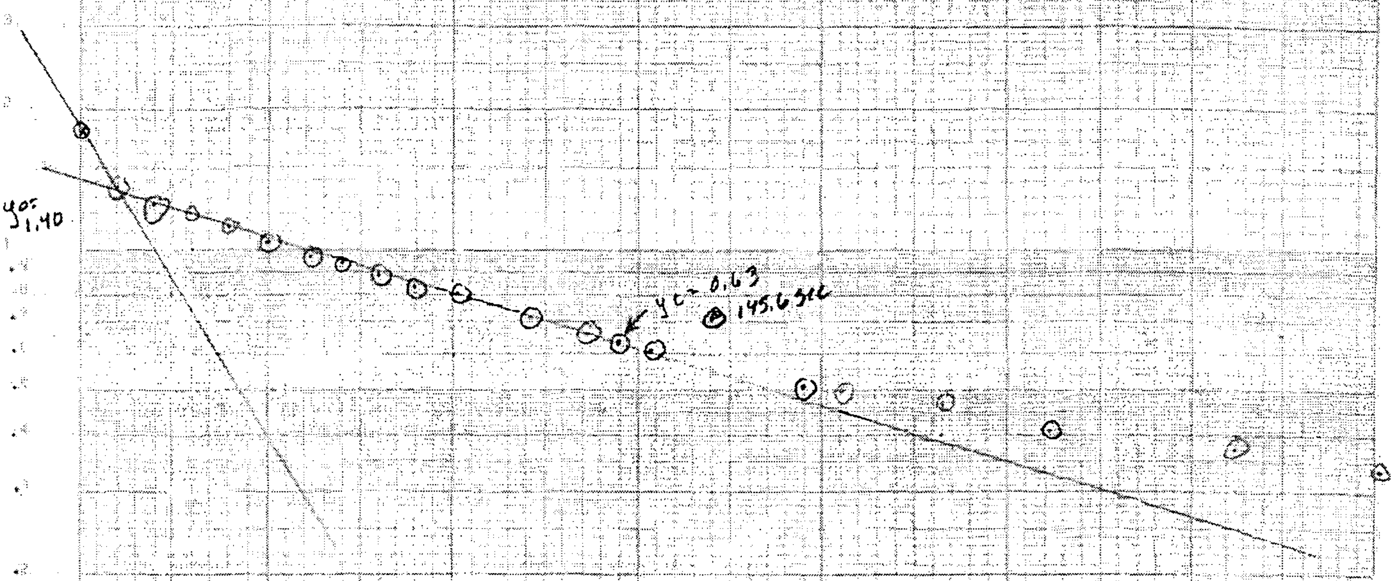


Fig. 2. Dimensionless parameters A, B, and C as a function of L_e/r_w for calculation of $\ln(R_e/r_w)$.

NAVAL STATION GREAT LAKES 112G01489
NTC21-MW02 RISING HEAD TEST
BOUWER AND RICE METHOD



$$Ln\ R_e/r_w = \left[\frac{1.1}{Ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1} = \left[\frac{1.1}{Ln\left(\frac{13.30}{0.37375}\right)} + \frac{0.95}{6.23}\right]^{-1} = \left[\frac{1.1}{3.65} + (0.152)\right] = \frac{1}{0.453}$$

$$Ln\ R_e/r_w = 2.21$$

$$K = \frac{(r_c^2)(Ln\ R_e/r_w)}{2(L_e)} \cdot \frac{1}{t} \cdot \frac{y_0}{y_t} = \frac{(0.007)(2.21)}{(22.0)} \cdot \frac{1}{145.6} \cdot \frac{1.40}{0.63} = (.000703)(0.0068)(2.22) =$$

$$= 1.06 \times 10^{-5}\ ft/sec \quad or \quad 3.23 \times 10^{-4}\ cm/sec$$

50 100 150 200 250 300

In-Situ Inc. MiniTroll Pro

Report generated:	11/27/2009	11:31:26
Report from file:	...\SN13334 2009-11-17 205500 NTC21 MW02.bin	
Win-Situ Version	4.47	
Serial number:	13334	
Firmware Version	3.09	
Unit name:	NTC21-MW02	
Test name:	NTC21 MW02 RH	
Test defined on:	11/17/2009	20:50:43
Test scheduled for:	11/17/2009	20:55:00
Test started on:	11/17/2009	20:55:00
Test stopped on:	N/A	N/A
Test extracted on:	N/A	N/A

Data gathered using Logarithmic testing
Maximum time between data points: (Seconds.
Number of data samples: 120

TOTAL DATA SAMPLES 120

Channel number [2]

Measurement type:	Pressure
Channel name:	OnBoard Pressure
Sensor Range:	30 PSIG.
Specific gravity:	1
Mode:	Surface
User-defined reference:	0 Feet H2O
Referenced on:	test start
Pressure head at reference:	12.875 Feet H2O

Monitoring Well	Northing	Easting	Elevation Top of PVC	Existing Ground Elevation	Total Depth	Screen Depth	Screen Elevation	Sand Dep
NTC21-MW02	2057873.49	1115236.52	653.66	654.25	16.00	6.00 - 16.00	647.66 - 637.66	5.00 -

Date	Time	ET (sec)	Chan[2] Feet H2O
11/17/2009	20:55:00	0	0
11/17/2009	20:55:00	0.3	0.014
11/17/2009	20:55:00	0.6	0.032
11/17/2009	20:55:00	0.9	0.018
11/17/2009	20:55:01	1.2	0.019
11/17/2009	20:55:01	1.5	0.036
11/17/2009	20:55:01	1.8	0.007
11/17/2009	20:55:02	2.1	0.021
11/17/2009	20:55:02	2.4	-0.04
11/17/2009	20:55:02	2.7	-1.549
11/17/2009	20:55:03	3	-1.387

Date	Time	ET (sec)	Drawdown	ET (sec)	Drawdown
11/17/2009	20:55:03	3.3	-1.787	0	1.79
11/17/2009	20:55:03	3.6	-1.724	0.3	1.72
11/17/2009	20:55:04	4.2	-1.693	0.9	1.69
11/17/2009	20:55:05	5.1	-1.522	1.8	1.52
11/17/2009	20:55:05	5.7	-1.512	2.4	1.51
11/17/2009	20:55:06	6	-1.484	2.7	1.48
11/17/2009	20:55:06	6.4	-1.47	3.1	1.47
11/17/2009	20:55:06	6.7	-1.461	3.4	1.46
11/17/2009	20:55:07	7.1	-1.455	3.8	1.46
11/17/2009	20:55:07	8	-1.436	4.7	1.44
11/17/2009	20:55:08	8.9	-1.44	5.6	1.44
11/17/2009	20:55:10	10.6	-1.425	7.3	1.43
11/17/2009	20:55:11	11.3	-1.419	8	1.42
11/17/2009	20:55:11	11.9	-1.404	8.6	1.40
11/17/2009	20:55:12	12.6	-1.385	9.3	1.39
11/17/2009	20:55:13	13.4	-1.376	10.1	1.38
11/17/2009	20:55:14	14.2	-1.385	10.9	1.39
11/17/2009	20:55:15	15	-1.376	11.7	1.38
11/17/2009	20:55:15	15.9	-1.366	12.6	1.37
11/17/2009	20:55:16	16.8	-1.357	13.5	1.36
11/17/2009	20:55:17	17.8	-1.33	14.5	1.33
11/17/2009	20:55:18	18.9	-1.336	15.6	1.34
11/17/2009	20:55:20	20	-1.326	16.7	1.33
11/17/2009	20:55:21	21.2	-1.313	17.9	1.31
11/17/2009	20:55:22	22.4	-1.3	19.1	1.30
11/17/2009	20:55:23	23.8	-1.271	20.5	1.27
11/17/2009	20:55:25	25.2	-1.275	21.9	1.28
11/17/2009	20:55:26	26.7	-1.254	23.4	1.25
11/17/2009	20:55:28	28.2	-1.248	24.9	1.25
11/17/2009	20:55:29	29.8	-1.235	26.5	1.24
11/17/2009	20:55:31	31.5	-1.22	28.2	1.22
11/17/2009	20:55:33	33.3	-1.206	30	1.21

11/17/2009	20:55:35	35.2	-1.191	31.9	1.19
11/17/2009	20:55:37	37.3	-1.174	34	1.17
11/17/2009	20:55:39	39.5	-1.157	36.2	1.16
11/17/2009	20:55:41	41.8	-1.122	38.5	1.12
11/17/2009	20:55:44	44.3	-1.121	41	1.12
11/17/2009	20:55:46	46.9	-1.102	43.6	1.10
11/17/2009	20:55:49	49.7	-1.102	46.4	1.10
11/17/2009	20:55:52	52.6	-1.083	49.3	1.08
11/17/2009	20:55:55	55.7	-1.027	52.4	1.03
11/17/2009	20:55:58	59	-1.022	55.7	1.02
11/17/2009	20:56:02	62.5	-1.006	59.2	1.01
11/17/2009	20:56:06	66.2	-0.972	62.9	0.97
11/17/2009	20:56:10	70.1	-0.976	66.8	0.98
11/17/2009	20:56:14	74.3	-0.955	71	0.96
11/17/2009	20:56:18	78.7	-0.896	75.4	0.90
11/17/2009	20:56:23	83.4	-0.892	80.1	0.89
11/17/2009	20:56:28	88.4	-0.885	85.1	0.89
11/17/2009	20:56:33	93.7	-0.829	90.4	0.83
11/17/2009	20:56:39	99.3	-0.818	96	0.82
11/17/2009	20:56:45	105.2	-0.812	101.9	0.81
11/17/2009	20:56:51	111.5	-0.753	108.2	0.75
11/17/2009	20:56:58	118.1	-0.728	114.8	0.73
11/17/2009	20:57:05	125.1	-0.721	121.8	0.72
11/17/2009	20:57:12	132.6	-0.698	129.3	0.70
11/17/2009	20:57:20	140.5	-0.656	137.2	0.66
11/17/2009	20:57:28	148.9	-0.631	145.6	0.63
11/17/2009	20:57:37	157.8	-0.605	154.5	0.61
11/17/2009	20:57:47	167.2	-0.58	163.9	0.58
11/17/2009	20:57:57	177.2	-0.576	173.9	0.58
11/17/2009	20:58:07	187.8	-0.57	184.5	0.57
11/17/2009	20:58:18	199	-0.513	195.7	0.51
11/17/2009	20:58:30	210.9	-0.504	207.6	0.50
11/17/2009	20:58:43	223.5	-0.475	220.2	0.48
11/17/2009	20:58:56	236.8	-0.465	233.5	0.47
11/17/2009	20:59:10	250.9	-0.443	247.6	0.44
11/17/2009	20:59:25	265.8	-0.408	262.5	0.41
11/17/2009	20:59:41	281.6	-0.408	278.3	0.41
11/17/2009	20:59:58	298.4	-0.387	295.1	0.39
11/17/2009	21:00:16	316.2	-0.368	312.9	0.37
11/17/2009	21:00:34	335	-0.336	331.7	0.34
11/17/2009	21:00:54	354.9	-0.33	351.6	0.33
11/17/2009	21:01:15	376	-0.322	372.7	0.32
11/17/2009	21:01:38	398.4	-0.324	395.1	0.32
11/17/2009	21:02:02	422.1	-0.294	418.8	0.29
11/17/2009	21:02:27	447.2	-0.28	443.9	0.28
11/17/2009	21:02:53	473.8	-0.269	470.5	0.27
11/17/2009	21:03:21	502	-0.25	498.7	0.25
11/17/2009	21:03:51	531.9	-0.248	528.6	0.25
11/17/2009	21:04:23	563.5	-0.229	560.2	0.23
11/17/2009	21:04:56	597	-0.212	593.7	0.21
11/17/2009	21:05:32	632.5	-0.22	629.2	0.22
11/17/2009	21:06:10	670.1	-0.214	666.8	0.21
11/17/2009	21:06:49	709.9	-0.207	706.6	0.21
11/17/2009	21:07:32	752.1	-0.201	748.8	0.20
11/17/2009	21:08:16	796.8	-0.186	793.5	0.19
11/17/2009	21:09:04	844.2	-0.207	840.9	0.21
11/17/2009	21:09:54	894.4	-0.167	891.1	0.17
11/17/2009	21:10:47	947.5	-0.18	944.2	0.18
11/17/2009	21:11:43	1003.8	-0.179	1000.5	0.18
11/17/2009	21:12:43	1063.4	-0.173	1060.1	0.17
11/17/2009	21:13:46	1126.6	-0.152	1123.3	0.15
11/17/2009	21:14:53	1193.5	-0.15	1190.2	0.15
11/17/2009	21:16:04	1264.4	-0.148	1261.1	0.15
11/17/2009	21:17:19	1339.5	-0.158	1336.2	0.16
11/17/2009	21:18:38	1419	-0.139	1415.7	0.14
11/17/2009	21:20:03	1503 3	-0.137	1500	0.14
11/17/2009	21:21:32	1592.6	-0.154	1589.3	0.15
11/17/2009	21:23:07	1687.1	-0.135	1683.8	0.14
11/17/2009	21:24:47	1787.2	-0.15	1783.9	0.15

Client: Naval Station Great Lakes

Project: NTC 21 - MW02

Project No.: 112601489

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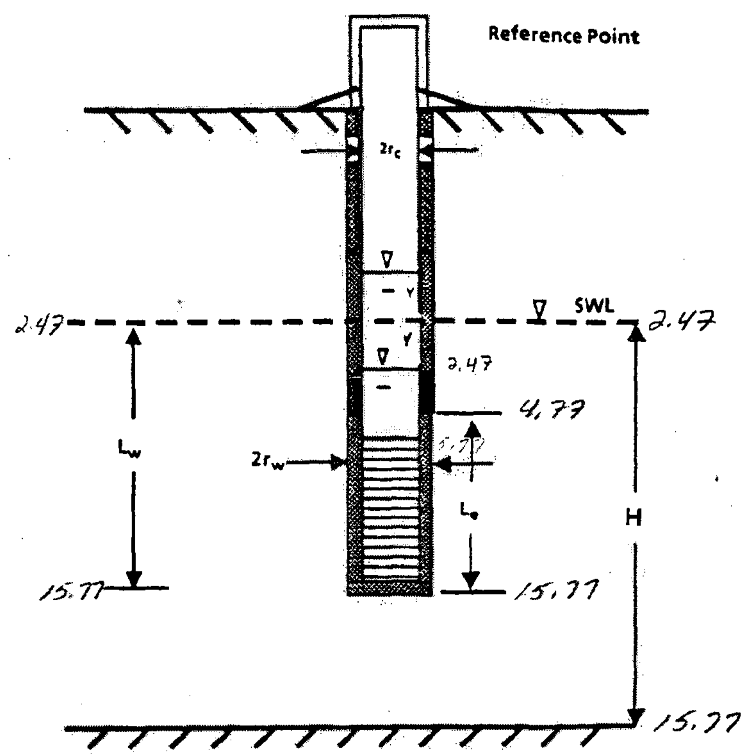
Schematic of Geometry and Boundary Conditions for a Screened Well

MW# MW02

Drawdown
-or-
Recovery Test
(circle)

H = 15.77 - 2.47 = 13.30
L_w = 13.30
L_e = 11.0
r_w = 0.34375
r_c = 0.083
L_e/r_w = 6.23;

∴ A = ___, B = ___, or C = 0.95



Known/Assume @ 15.77 feet
(circle)

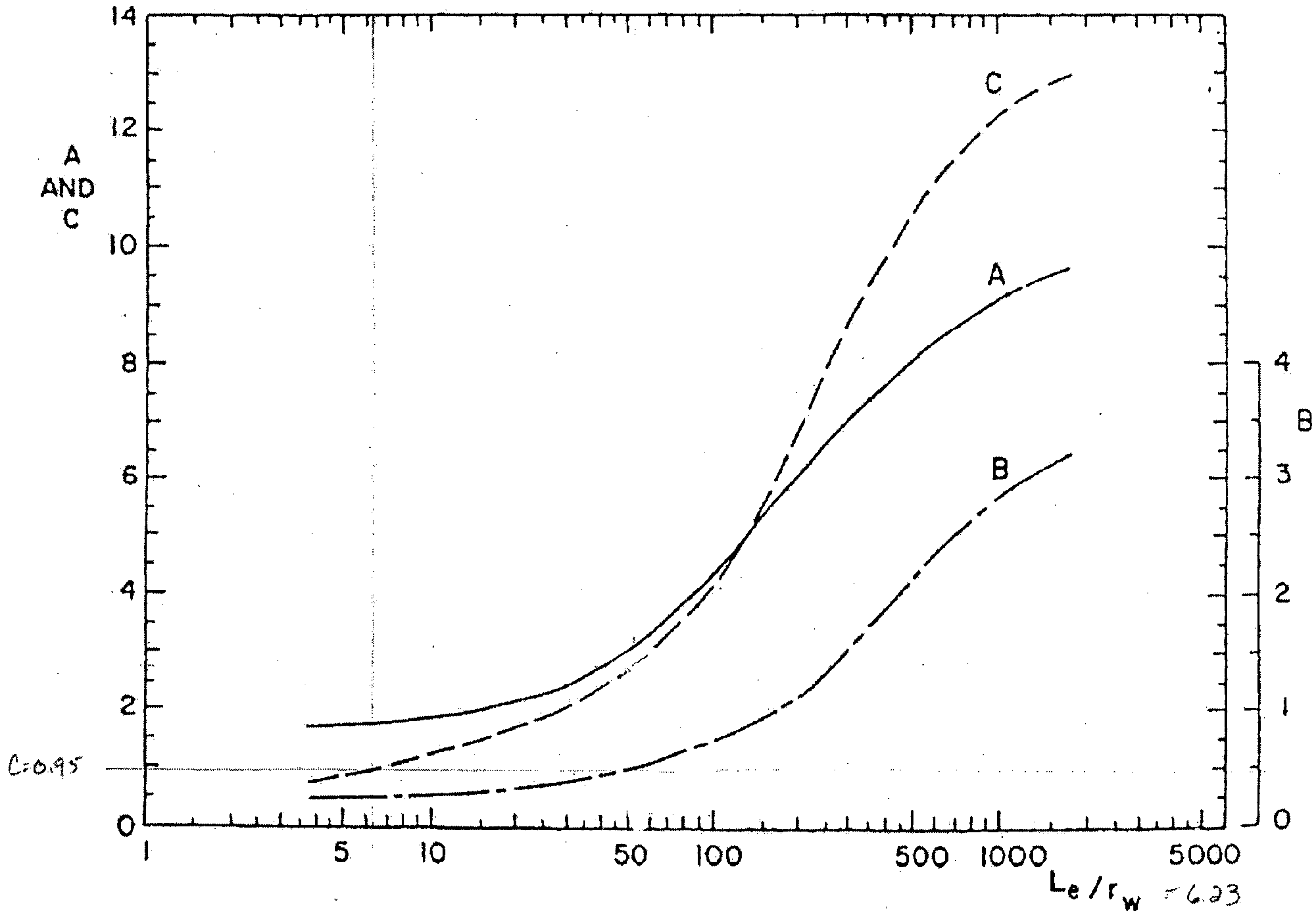


Fig. 2. Dimensionless parameters A, B, and C as a function of L_e/r_W for calculation of $\ln(R_e/r_W)$.

Great Lakes Naval Station 112G02489
NTC 21 - MW05 Rising Head Slug Test
Bouwer and Rice Method

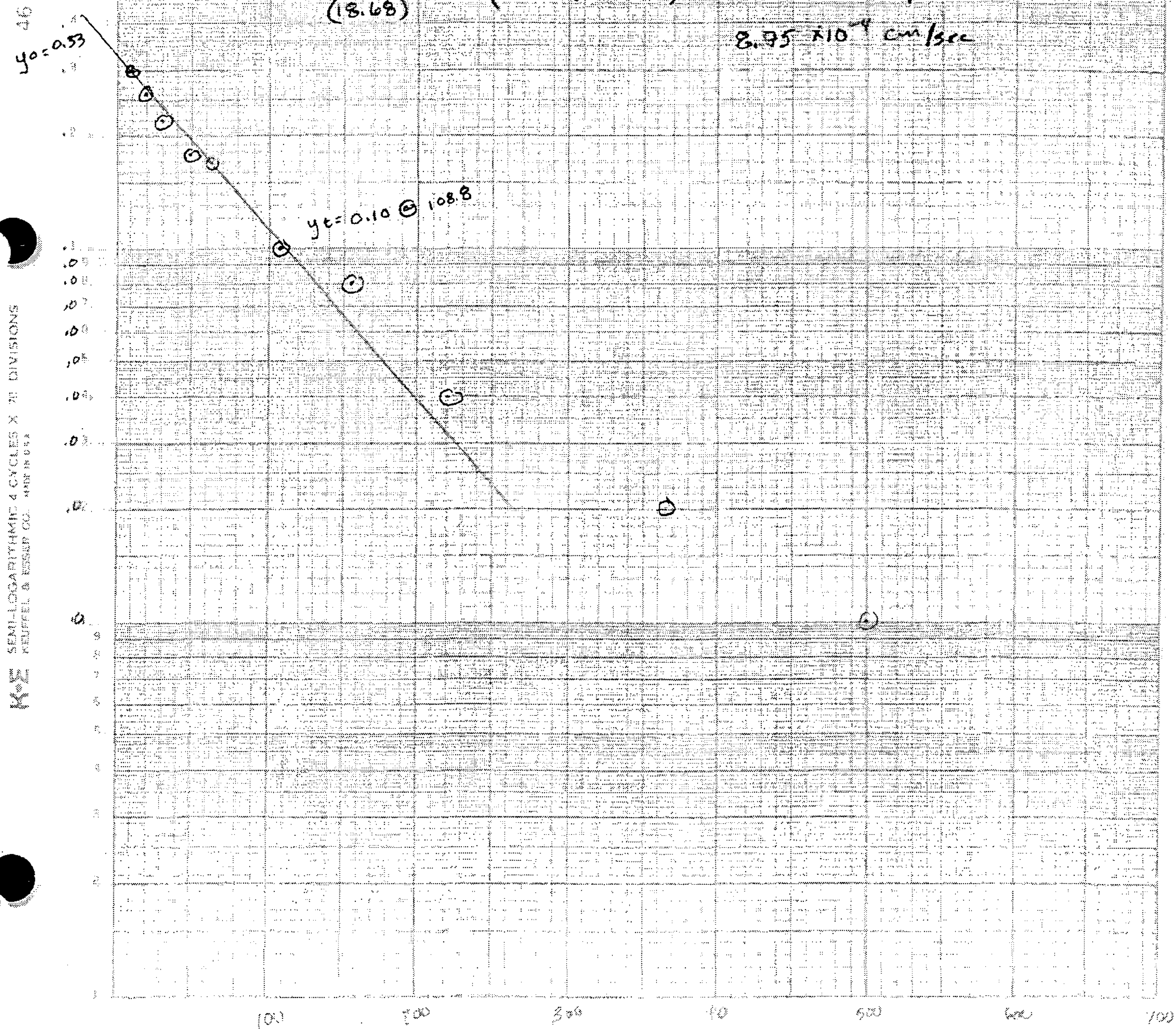
$$\ln R_e/r_w = \left[\frac{1.1}{\ln(L_e/r_w)} + \frac{C}{L_e/r_w}\right]^{-1} = \left[\frac{1.1}{\ln\left(\frac{9.30}{0.34375}\right)} + \frac{1.6}{9.7/0.34375}\right]^{-1} = \left[\frac{1.1}{3.33} + \frac{1.6}{28.25}\right]^{-1} =$$

$$= \left[(0.330)+(0.057)\right]^{-1} = \frac{1}{0.387} = 2.58 = \ln R_e/r_w$$

$$K_c = \frac{(r_c^2)\ln R_e/r_w}{2(L_e)} \cdot \frac{1}{t} \cdot \frac{y_0}{y_t} = \frac{(0.083^2)(2.58)}{2(9.34)} \cdot \left(\frac{1}{108.8}\right)\left(\frac{0.33}{0.10}\right)$$

$$= \frac{(0.007)(2.58)}{(18.68)} \cdot (0.009)(3.30) = 2.87 \times 10^{-5} \text{ ft/sec or}$$

$$8.75 \times 10^{-4} \text{ cm/sec}$$



In-Situ Inc. MiniTroll Pro

Report generated:		11/27/2009	11:28:07
Report from file:	...\SN13334 2009-11-17 214500 NTC21 MW05 RH.bin		
Win-Situ Version		4.47	
Serial number:		13334	
Firmware Version		3.09	
Unit name:	NTC21-MW05		
Test name:		NTC21 MW05 RH	
Test defined on:		11/17/2009	21:40:45
Test scheduled for		11/17/2009	21:45:00
Test started on:		11/17/2009	21:45:00
Test stopped on:	N/A	N/A	
Test extracted on:	N/A	N/A	

Data gathered using Logarithmic testing
Maximum time between data points: Seconds.
Number of data samples: 105

TOTAL DATA SAMPLES 105

Channel number [2]

Measurement type:	Pressure	
Channel name:	OnBoard Pressure	
Sensor Range:	30 PSIG.	
Specific gravity:		1
Mode:	Surface	
User-defined reference:		0 Feet H2O
Referenced on:	test start	
Pressure head at reference:		9.676 Feet H2O

Monitoring Well	Northing	Easting	Elevation Top of PVC	Existing Ground Elevation	Total Depth	Screen Depth	Screen Elevation	Sandpack Depth	Sandp Eleva
NTC21-MW05	2057518.81	1115138.92	655.03	655.28	16.00	6.00 - 16.00	649.03 - 639.03	2.00 - 14.00	653.03 -

Date	Time	ET (sec)	Chan[2] Feet H2O
11/17/2009	21:45:00	0	0
11/17/2009	21:45:00	0.3	0.01
11/17/2009	21:45:00	0.6	-0.02
11/17/2009	21:45:00	0.9	-0.013
11/17/2009	21:45:01	1.2	0.017
11/17/2009	21:45:01	1.5	0
11/17/2009	21:45:01	1.8	0.015
11/17/2009	21:45:02	2.1	0.002
11/17/2009	21:45:02	2.4	-0.059

Date	Time	ET (sec)	Drawdown	ET (sec)	Drawdown
11/17/2009	21:45:02	2.7	-1.211	0	1.21
11/17/2009	21:45:03	3	-0.715	0.3	0.72
11/17/2009	21:45:03	3.3	-1.173	0.6	1.17
11/17/2009	21:45:03	3.6	-1.196	0.9	1.20
11/17/2009	21:45:03	3.9	-0.984	1.2	0.98
11/17/2009	21:45:04	4.2	-0.839	1.5	0.84
11/17/2009	21:45:04	4.5	-0.719	1.8	0.72
11/17/2009	21:45:04	4.8	-0.623	2.1	0.62
11/17/2009	21:45:05	5.1	-0.545	2.4	0.55
11/17/2009	21:45:05	5.4	-0.478	2.7	0.48
11/17/2009	21:45:05	5.7	-0.446	3	0.45
11/17/2009	21:45:06	6	-0.394	3.3	0.39
11/17/2009	21:45:06	6.4	-0.406	3.7	0.41
11/17/2009	21:45:06	6.7	-0.358	4	0.36
11/17/2009	21:45:07	7.1	-0.362	4.4	0.36
11/17/2009	21:45:07	7.5	-0.352	4.8	0.35
11/17/2009	21:45:07	8	-0.344	5.3	0.34
11/17/2009	21:45:08	8.4	-0.32	5.7	0.32
11/17/2009	21:45:08	8.9	-0.329	6.2	0.33
11/17/2009	21:45:09	9.5	-0.341	6.8	0.34
11/17/2009	21:45:10	10	-0.341	7.3	0.34
11/17/2009	21:45:10	10.6	-0.301	7.9	0.30
11/17/2009	21:45:11	11.3	-0.313	8.6	0.31
11/17/2009	21:45:11	11.9	-0.294	9.2	0.29
11/17/2009	21:45:12	12.6	-0.307	9.9	0.31
11/17/2009	21:45:13	13.4	-0.303	10.7	0.30
11/17/2009	21:45:14	14.2	-0.292	11.5	0.29
11/17/2009	21:45:15	15	-0.292	12.3	0.29
11/17/2009	21:45:15	15.9	-0.288	13.2	0.29
11/17/2009	21:45:16	16.8	-0.285	14.1	0.29
11/17/2009	21:45:17	17.8	-0.296	15.1	0.30
11/17/2009	21:45:18	18.9	-0.258	16.2	0.26
11/17/2009	21:45:20	20	-0.285	17.3	0.29
11/17/2009	21:45:21	21.2	-0.281	18.5	0.28
11/17/2009	21:45:22	22.4	-0.26	19.7	0.26
11/17/2009	21:45:23	23.8	-0.239	21.1	0.24
11/17/2009	21:45:25	25.2	-0.253	22.5	0.25
11/17/2009	21:45:26	26.7	-0.245	24	0.25
11/17/2009	21:45:28	28.2	-0.224	25.5	0.22
11/17/2009	21:45:29	29.8	-0.22	27.1	0.22
11/17/2009	21:45:31	31.5	-0.232	28.8	0.23
11/17/2009	21:45:33	33.3	-0.222	30.6	0.22
11/17/2009	21:45:35	35.2	-0.224	32.5	0.22
11/17/2009	21:45:37	37.3	-0.217	34.6	0.22
11/17/2009	21:45:39	39.5	-0.194	36.8	0.19

11/17/2009	21:45:41	41.8	-0.192	39.1	0.19
11/17/2009	21:45:44	44.3	-0.217	41.6	0.22
11/17/2009	21:45:46	46.9	-0.205	44.2	0.21
11/17/2009	21:45:49	49.7	-0.194	47	0.19
11/17/2009	21:45:52	52.6	-0.179	49.9	0.18
11/17/2009	21:45:55	55.7	-0.162	53	0.16
11/17/2009	21:45:58	59	-0.158	56.3	0.16
11/17/2009	21:46:02	62.5	-0.183	59.8	0.18
11/17/2009	21:46:06	66.2	-0.145	63.5	0.15
11/17/2009	21:46:10	70.1	-0.152	67.4	0.15
11/17/2009	21:46:14	74.3	-0.152	71.6	0.15
11/17/2009	21:46:18	78.7	-0.145	76	0.15
11/17/2009	21:46:23	83.4	-0.139	80.7	0.14
11/17/2009	21:46:28	88.4	-0.118	85.7	0.12
11/17/2009	21:46:33	93.7	-0.126	91	0.13
11/17/2009	21:46:39	99.3	-0.105	96.6	0.11
11/17/2009	21:46:45	105.2	-0.128	102.5	0.13
11/17/2009	21:46:51	111.5	-0.097	108.8	0.10
11/17/2009	21:46:58	118.1	-0.103	115.4	0.10
11/17/2009	21:47:05	125.1	-0.084	122.4	0.08
11/17/2009	21:47:12	132.6	-0.113	129.9	0.11
11/17/2009	21:47:20	140.5	-0.092	137.8	0.09
11/17/2009	21:47:28	148.9	-0.086	146.2	0.09
11/17/2009	21:47:37	157.8	-0.082	155.1	0.08
11/17/2009	21:47:47	167.2	-0.083	164.5	0.08
11/17/2009	21:47:57	177.2	-0.071	174.5	0.07
11/17/2009	21:48:07	187.8	-0.052	185.1	0.05
11/17/2009	21:48:18	199	-0.047	196.3	0.05
11/17/2009	21:48:30	210.9	-0.058	208.2	0.06
11/17/2009	21:48:43	223.5	-0.039	220.8	0.04
11/17/2009	21:48:56	236.8	-0.034	234.1	0.03
11/17/2009	21:49:10	250.9	-0.049	248.2	0.05
11/17/2009	21:49:25	265.8	-0.045	263.1	0.05
11/17/2009	21:49:41	281.6	-0.041	278.9	0.04
11/17/2009	21:49:58	298.4	-0.039	295.7	0.04
11/17/2009	21:50:16	316.2	-0.036	313.5	0.04
11/17/2009	21:50:34	335	-0.032	332.3	0.03
11/17/2009	21:50:54	354.9	-0.032	352.2	0.03
11/17/2009	21:51:15	376	-0.015	373.3	0.02
11/17/2009	21:51:38	398.4	-0.032	395.7	0.03
11/17/2009	21:52:02	422.1	-0.028	419.4	0.03
11/17/2009	21:52:27	447.2	-0.011	444.5	0.01
11/17/2009	21:52:53	473.8	-0.023	471.1	0.02
11/17/2009	21:53:21	502	-0.012	499.3	0.01
11/17/2009	21:53:51	531.9	-0.006	529.2	0.01
11/17/2009	21:54:23	563.5	-0.023	560.8	0.02
11/17/2009	21:54:56	597	-0.019	594.3	0.02
11/17/2009	21:55:32	632.5	-0.004	629.8	0.00
11/17/2009	21:56:10	670.1	-0.017	667.4	0.02
11/17/2009	21:56:49	709.9	-0.002	707.2	0.00
11/17/2009	21:57:32	752.1	-0.018	749.4	0.02

Client: *Naval Station Great Lakes* Project: *NTC21-MW06*

Project No.: *112601489* Page *4* of *5*

Schematic of Geometry and Boundary Conditions for a <u>Screened Well</u>

MW# *MW06*

Drawdown
-or-
Recovery Test
(circle)

H = *12.68* - *2.98* = *9.7*

L_w = *9.70*

L_e = *9.70*

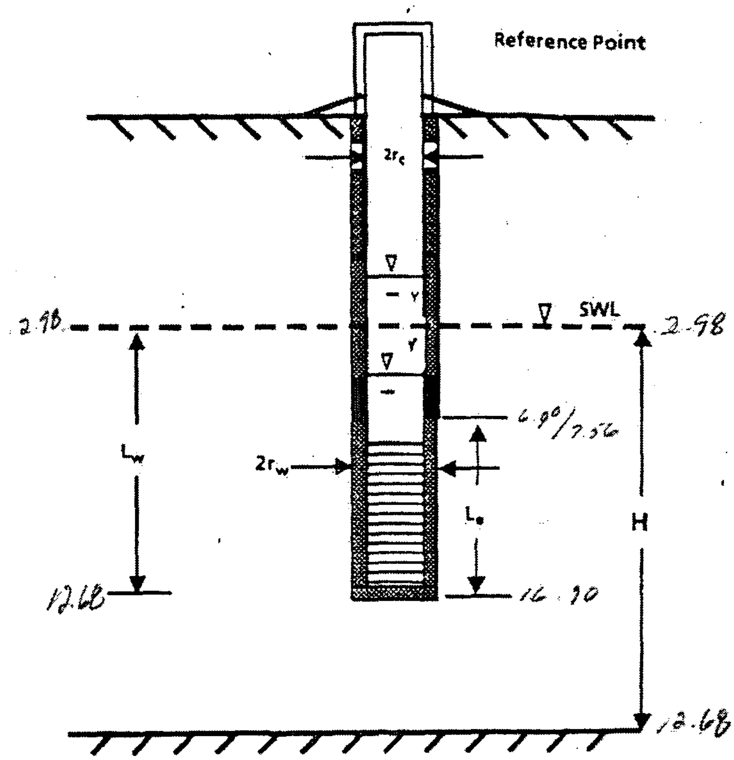
r_w = *0.34375*

r_c = *0.083*

L_e/r_w = *28.21*

∴ A = ____, B = ____, or C = *1.6*

H = Lw



Relatively Impermeable Material

Known/Assume @ *16.90* feet
(circle)

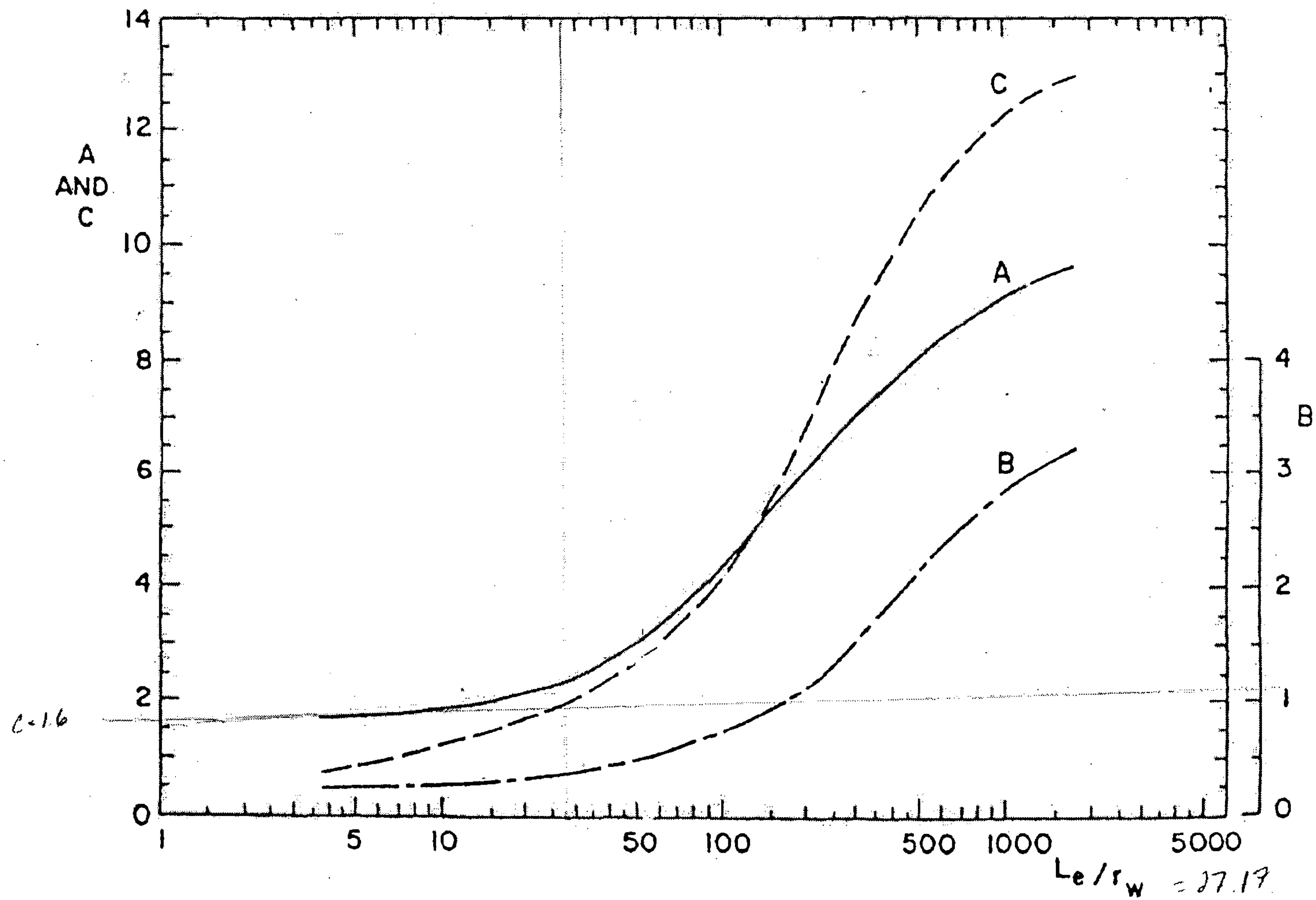


Fig. 2. Dimensionless parameters A, B, and C as a function of L_e/r_w for calculation of $\ln(R_e/r_w)$.

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NAVAL STATION GREAT LAKES 112G01429
NTL21-MW06 Rising Head Slug Test
Bouwer and Rice METHOD

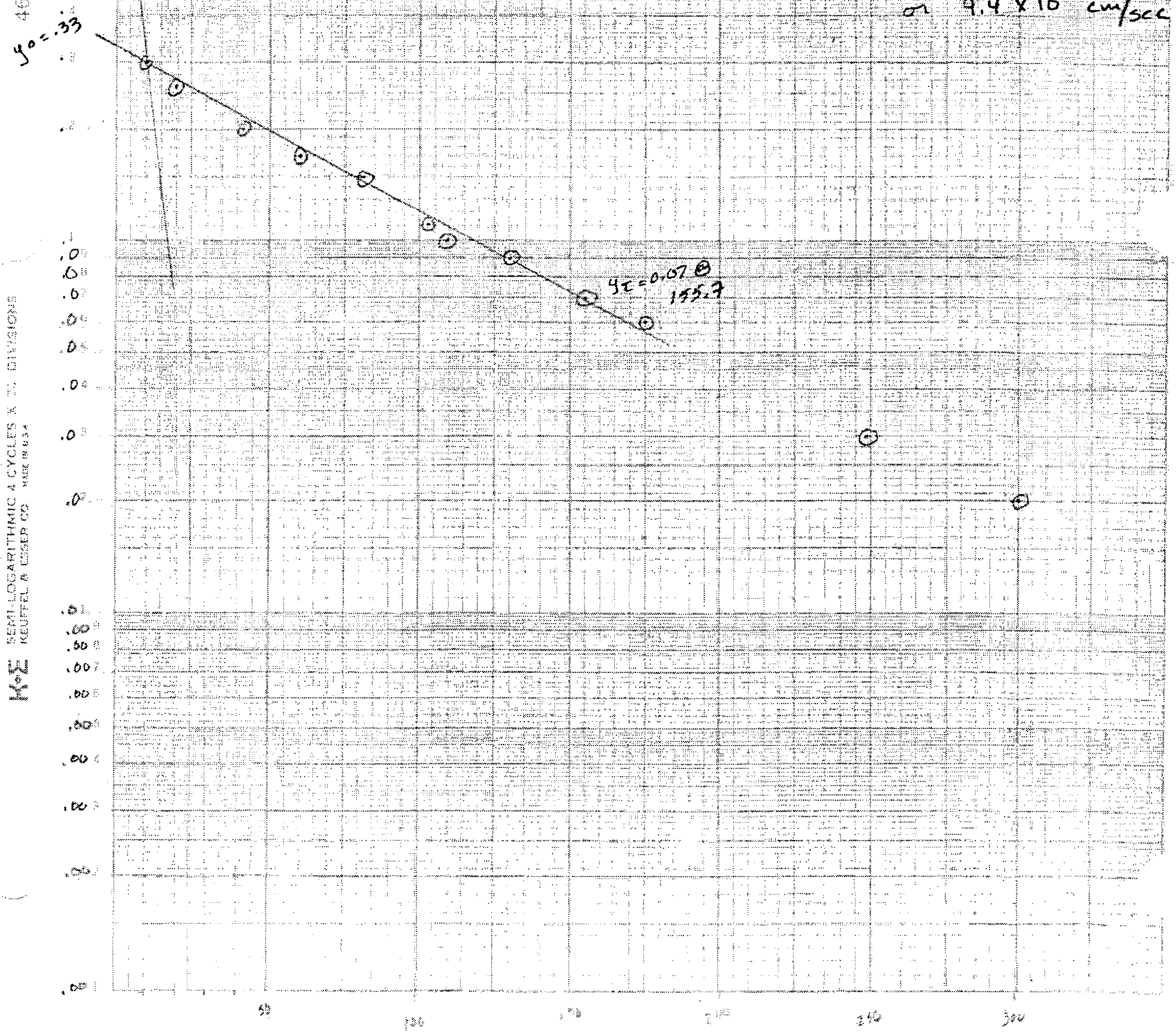
$$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1} = \left[\frac{1.1}{\ln\left(\frac{7.33}{0.34375}\right)} + \frac{1.6}{\frac{7.33}{0.34375}}\right]^{-1} = \left[\frac{1.1}{3.05} + \frac{1.6}{21.32}\right]^{-1}$$

$$= \left[0.36 + 0.075\right]^{-1} = \frac{1}{.435} = 2.30$$

$$K = \frac{(r_c^2)\ \ln R_e/r_w}{2L_e} \cdot \frac{1}{t} \cdot \frac{y_o}{y_t} = \frac{(0.007)(2.30)}{(14.66)} \left(\frac{1}{155.7}\right) \cdot \left(\frac{0.33}{0.07}\right)$$

$$= \frac{(0.0161)}{14.66} \cdot (0.006)(4.71) = (0.011)(0.028) = 3.08 \times 10^{-4}\ ft/sec$$

or 9.4×10^{-3} cm/sec



Pag 2 of 6

In-Situ Inc. MiniTroll Pro

Report generated: 11/19/2009 12:21:10
Report from file: ...\SN13334 2009-11-18 093500 NTC21 MW06.bin
Win-Situ Version 4.47

Serial number: 13334
Firmware Version 3.09
Unit name: NTC21-MW06

Test name: NTC21 MW06

Test defined on: 11/18/2009 9:30:08
Test scheduled for: 11/18/2009 9:35:00
Test started on: 11/18/2009 9:35:00
Test stopped on: N/A N/A
Test extracted on: N/A N/A

Data gathered using Logarithmic testing
Maximum time between data p Seconds.
Number of data samples: 94

TOTAL DATA SAMPLES 94

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSIG.
Specific gravity: 1
Mode: Surface
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 6.848 Feet H2O

Monitoring Well	Northing	Easting	Elevation Top of PVC	Existing Ground Elevation	Total Depth	Screen Depth	Screen Elevation	Sandpack Depth	Sandpack Elevation
NTC21-MW06	2057503.81	1114703.35	659.17	659.53	14.00	4.00 - 14.00	655.17 - 645.17	3.00 - 14.00	656.17 - 645.17

Date	Time	ET (sec)	Chan[2] Feet H2O
11/18/2009	9:35:00	0	0
11/18/2009	9:35:00	0.3	0.01
11/18/2009	9:35:00	0.6	-0.005
11/18/2009	9:35:00	0.9	0.028
11/18/2009	9:35:01	1.2	0.022
11/18/2009	9:35:01	1.5	0.03
11/18/2009	9:35:01	1.8	-0.695

Date	Time	ET (sec)	Drawdown	ET (sec)	Drawdown
11/18/2009	9:35:02	2.1	-1.65	0	1.65
11/18/2009	9:35:02	2.4	-1.547	0.3	1.55
11/18/2009	9:35:02	2.7	-1.29	0.6	1.29
11/18/2009	9:35:03	3	-1.147	0.9	1.15
11/18/2009	9:35:03	3.3	-0.992	1.2	0.99
11/18/2009	9:35:03	3.6	-0.883	1.5	0.88
11/18/2009	9:35:03	3.9	-0.742	1.8	0.74
11/18/2009	9:35:04	4.2	-0.635	2.1	0.64
11/18/2009	9:35:04	4.5	-0.58	2.4	0.58
11/18/2009	9:35:04	4.8	-0.509	2.7	0.51
11/18/2009	9:35:05	5.1	-0.475	3	0.48
11/18/2009	9:35:05	5.4	-0.439	3.3	0.44
11/18/2009	9:35:05	5.7	-0.45	3.6	0.45
11/18/2009	9:35:06	6	-0.446	3.9	0.45
11/18/2009	9:35:06	6.4	-0.418	4.3	0.42
11/18/2009	9:35:06	6.7	-0.389	4.6	0.39
11/18/2009	9:35:07	7.1	-0.396	5	0.40
11/18/2009	9:35:07	7.5	-0.387	5.4	0.39
11/18/2009	9:35:07	8	-0.364	5.9	0.36
11/18/2009	9:35:08	8.4	-0.417	6.3	0.42
11/18/2009	9:35:08	8.9	-0.362	6.8	0.36
11/18/2009	9:35:09	9.5	-0.328	7.4	0.33
11/18/2009	9:35:10	10	-0.336	7.9	0.34
11/18/2009	9:35:10	10.6	-0.33	8.5	0.33
11/18/2009	9:35:11	11.3	-0.325	9.2	0.33
11/18/2009	9:35:11	11.9	-0.338	9.8	0.34
11/18/2009	9:35:12	12.6	-0.302	10.5	0.30
11/18/2009	9:35:13	13.4	-0.309	11.3	0.31
11/18/2009	9:35:14	14.2	-0.294	12.1	0.29
11/18/2009	9:35:15	15	-0.307	12.9	0.31
11/18/2009	9:35:15	15.9	-0.287	13.8	0.29
11/18/2009	9:35:16	16.8	-0.3	14.7	0.30
11/18/2009	9:35:17	17.8	-0.279	15.7	0.28
11/18/2009	9:35:18	18.9	-0.289	16.8	0.29
11/18/2009	9:35:20	20	-0.285	17.9	0.29
11/18/2009	9:35:21	21.2	-0.3	19.1	0.30
11/18/2009	9:35:22	22.4	-0.262	20.3	0.26
11/18/2009	9:35:23	23.8	-0.291	21.7	0.29
11/18/2009	9:35:25	25.2	-0.266	23.1	0.27

11/18/2009	9:35:26	26.7	-0.26	24.6	0.26
11/18/2009	9:35:28	28.2	-0.241	26.1	0.24
11/18/2009	9:35:29	29.8	-0.237	27.7	0.24
11/18/2009	9:35:31	31.5	-0.249	29.4	0.25
11/18/2009	9:35:33	33.3	-0.262	31.2	0.26
11/18/2009	9:35:35	35.2	-0.256	33.1	0.26
11/18/2009	9:35:37	37.3	-0.232	35.2	0.23
11/18/2009	9:35:39	39.5	-0.245	37.4	0.25
11/18/2009	9:35:41	41.8	-0.222	39.7	0.22
11/18/2009	9:35:44	44.3	-0.198	42.2	0.20
11/18/2009	9:35:46	46.9	-0.194	44.8	0.19
11/18/2009	9:35:49	49.7	-0.19	47.6	0.19
11/18/2009	9:35:52	52.6	-0.198	50.5	0.20
11/18/2009	9:35:55	55.7	-0.192	53.6	0.19
11/18/2009	9:35:58	59	-0.169	56.9	0.17
11/18/2009	9:36:02	62.5	-0.165	60.4	0.17
11/18/2009	9:36:06	66.2	-0.19	64.1	0.19
11/18/2009	9:36:10	70.1	-0.15	68	0.15
11/18/2009	9:36:14	74.3	-0.146	72.2	0.15
11/18/2009	9:36:18	78.7	-0.156	76.6	0.16
11/18/2009	9:36:23	83.4	-0.15	81.3	0.15
11/18/2009	9:36:28	88.4	-0.127	86.3	0.13
11/18/2009	9:36:33	93.7	-0.137	91.6	0.14
11/18/2009	9:36:39	99.3	-0.129	97.2	0.13
11/18/2009	9:36:45	105.2	-0.108	103.1	0.11
11/18/2009	9:36:51	111.5	-0.103	109.4	0.10
11/18/2009	9:36:58	118.1	-0.112	116	0.11
11/18/2009	9:37:05	125.1	-0.101	123	0.10
11/18/2009	9:37:12	132.6	-0.087	130.5	0.09
11/18/2009	9:37:20	140.5	-0.078	138.4	0.08
11/18/2009	9:37:28	148.9	-0.091	146.8	0.09
11/18/2009	9:37:37	157.8	-0.07	155.7	0.07
11/18/2009	9:37:47	167.2	-0.08	165.1	0.08
11/18/2009	9:37:57	177.2	-0.059	175.1	0.06
11/18/2009	9:38:07	187.8	-0.055	185.7	0.06
11/18/2009	9:38:18	199	-0.082	196.9	0.08
11/18/2009	9:38:30	210.9	-0.055	208.8	0.06
11/18/2009	9:38:43	223.5	-0.057	221.4	0.06
11/18/2009	9:38:56	236.8	-0.053	234.7	0.05
11/18/2009	9:39:10	250.9	-0.032	248.8	0.03
11/18/2009	9:39:25	265.8	-0.045	263.7	0.05
11/18/2009	9:39:41	281.6	-0.026	279.5	0.03
11/18/2009	9:39:58	298.4	-0.024	296.3	0.02
11/18/2009	9:40:16	316.2	-0.036	314.1	0.04
11/18/2009	9:40:34	335	-0.034	332.9	0.03
11/18/2009	9:40:54	354.9	-0.032	352.8	0.03
11/18/2009	9:41:15	376	-0.013	373.9	0.01
11/18/2009	9:41:38	398.4	-0.028	396.3	0.03

Client: Naval Station Great Lakes

Project: NTC21 MW06

Project No.: 112G01489

Schematic of Geometry and Boundary Conditions for a Screened Well

MW# MW06

Drawdown
-or-
Recovery Test
(circle)

H = 13.60 - 6.27 = 7.33

L_w = 7.33

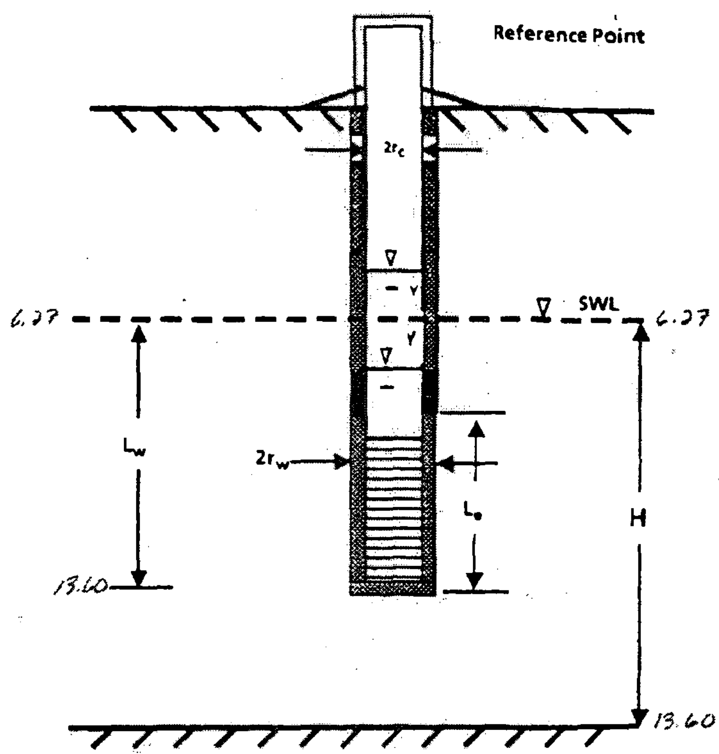
L_e = 7.33

r_w = 0.34375

r_c = 0.083

L_e/r_w = 21.32 ;

∴ A = ____, B = ____, or C = 1.60



Relatively Impermeable Material

Known/Assume @ ______ feet
(circle)

5 of 5

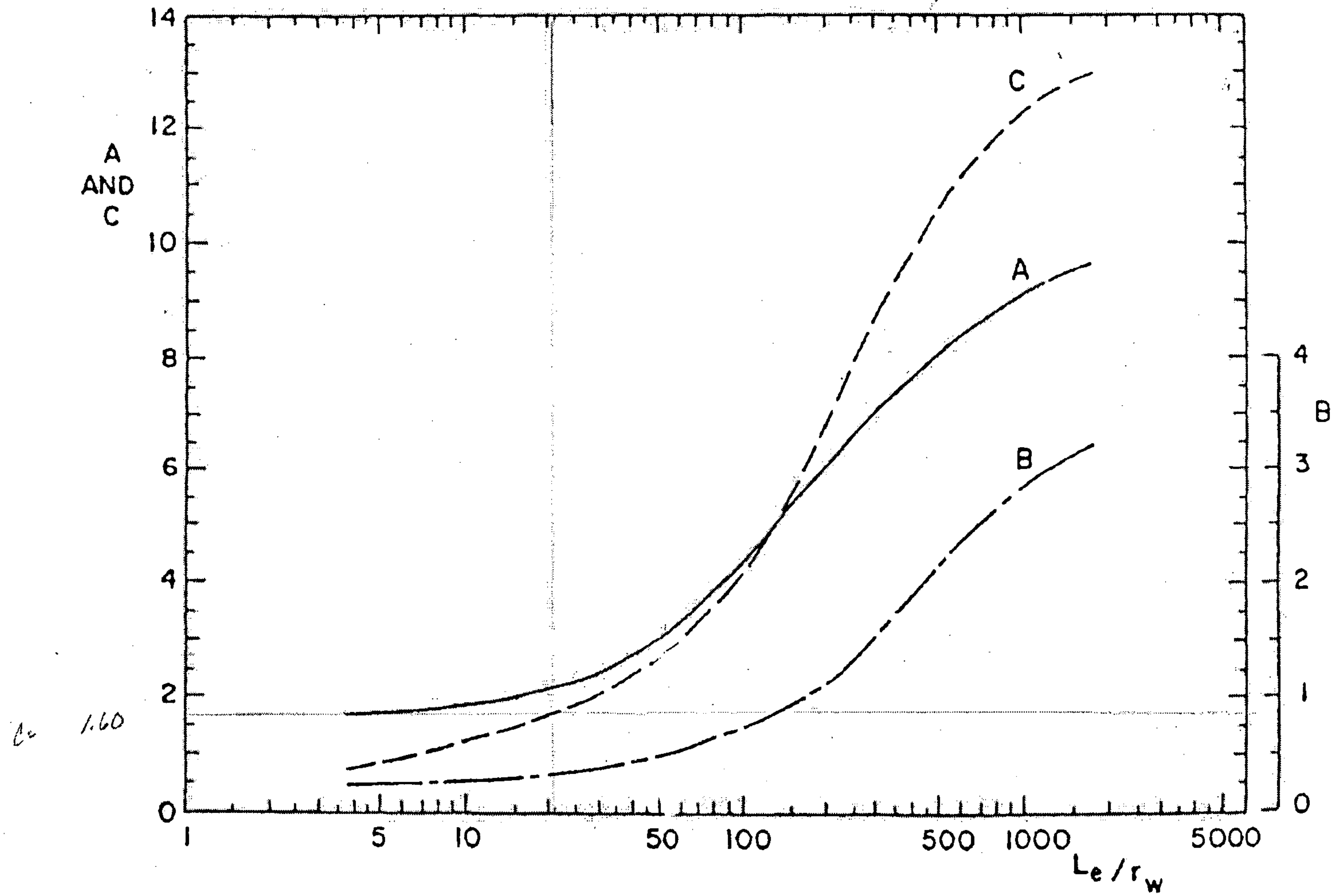


Fig. 2. Dimensionless parameters A, B, and C as a function of L_e/r_w for calculation of $\ln(R_e/r_w)$.

B-6 SAMPLE LOG AND PURGE SHEETS - GROUNDWATER

TETRA TECH NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Event: Site 21 - Investigation
Site Name: GREAT LAKES NTC - Site 21
Project No: 112G01797.0000.0320 (ED00000105)

Sample ID:	**NTC21-MW01-DEVELOPMENT**	Sampler:	Nicole Rochna
Well ID:	NTC21-MW01	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	4.92
Top of Screen (ft-BTOR)	4	H&S PID Monitor Reading (ppm)	NA
Bottom of Screen (ft-BTOR)	14	Purge Method	Submersible pump
Total Depth of Well (ft-BTOR)	14	Sample Method	High velocity developement purge

Equipment

Water Quality Meter:	05D2372	Pump Control Box:	N/A	Turbidity Meter:	ME 13089

Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11/14/09	9:10	4.92	1250.0	Highly Turbid	None	NA	NA	NA	NA	NA	NA	NA	N/A
11/14/09	9:30	5.05	1250.0	Clear	None	11.80	3.018	0.62	7.05	14.32	-73.8	NA	N/A
11/14/09	9:50	5.05	1250.0	Clear	None	11.65	3.108	0.55	2.63	14.40	-82.4	NA	N/A
11/14/09	10:10	5.05	1250.0	Clear	None	11.55	3.138	0.51	1.63	14.45	-87.2	NA	N/A
11/14/09	10:30	5.05	1250.0	Clear	None	11.26	3.188	1.28	37.8	14.61	-47.5	NA	N/A

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
10:10	11:30	80	100.0	Clear	None	11.26	3.188	1.28	37.8	14.61	-47.5	NA	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.

General Notes

Initial well development log

TETRA TECH NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Event: Site 21 - Investigation
Site Name: GREAT LAKES NTC - Site 21
Project No: 112G01797.0000.0320 (ED00000105)

Sample ID:	**NTC21MW0101**	Sampler:	Nicole Rochna
Well ID:	NTC21-MW01	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	5.01
Top of Screen (ft-BTOR)	4	H&S PID Monitor Reading (ppm)	NA
Bottom of Screen (ft-BTOR)	14	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	14	Sample Method	Low flow - peristaltic

Equipment

Water Quality Meter:	05D2372	Pump Control Box:	H07006412	Turbidity Meter:	ME 13089

Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11/17/09	10:30	5.01	250.0	Cloudy	None	NA	NA	NA	NA	NA	NA	NA	N/A
11/17/09	10:40	5.03	250.0	Clear	None	11.82	2.608	0.88	20.4	13.13	-60.3	NA	N/A
11/17/09	10:50	5.03	250.0	Clear	None	11.78	2.752	0.76	17.8	13.16	-70.8	NA	N/A
11/17/09	11:00	5.03	200.0	Clear	None	11.81	2.832	0.74	12.6	13.11	-73.7	NA	N/A
11/17/09	11:10	5.03	200.0	Clear	None	11.77	2.867	0.72	10.06	13.17	-79.1	NA	N/A
11/17/09	11:20	5.03	200.0	Clear	None	11.72	2.923	0.68	9.05	13.16	-78.3	NA	N/A
11/17/09	11:30	5.03	200.0	Clear	None	11.71	2.938	0.56	6.66	13.10	-78.9	NA	N/A
11/17/09	11:40	5.03	200.0	Clear	None	11.71	2.932	0.72	6.02	13.05	-79.7	NA	N/A

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11:30	12:40	70	15.0	Clear	None	11.71	2.932	0.72	6.02	13.05	-79.7	NA	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	11/17/09	11:45	TAL Metals (Total)	SW-846 6010B	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000105-6
✓	11/17/09	11:45	TCL VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000105-6
✓	11/17/09	11:45	TCL SVOCs/Herb/Pest/PCB	SW-846 8270C/8181/8081A/8082	4°C	6	Glass - Amber	1L	None	ED00000105-6
✗	N/A	N/A	TAL Metals (Dissolved)	SW-846 6010B - Filtered	4°C/HNO3	1	Plastic - PE	250ml	None	N/A

General Notes

None

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH NUS, Inc.

Event: Site 21 - Investigation
Site Name: GREAT LAKES NTC - Site 21
Project No: 112G01797.0000.0320 (ED00000105)

Sample ID:	**NTC21-MW02-DEVELOPMENT**	Sampler:	Shannon Hill
Well ID:	NTC21-MW02	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	4
Top of Screen (ft-BTOR)	6	H&S PID Monitor Reading (ppm)	0.0
Bottom of Screen (ft-BTOR)	16	Purge Method	Submersible pump
Total Depth of Well (ft-BTOR)	16	Sample Method	High velocity developement

Equipment

Water Quality Meter:	08K100392	Pump Control Box:	N/A	Turbidity Meter:	ME12230

Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11/14/09	9:19	6.4	2500.0	Cloudy	None	6.4	5.233	1.74	243	14.4	-15.4	na	N/A
11/14/09	9:39	7.75	1800.0	Cloudy	None	6.39	5.312	0.57	632	14.71	-62.5	na	N/A
11/14/09	9:51	8.5	1500.0	Cloudy	None	6.35	5.340	0.46	5875	14.78	-68.3	na	N/A
11/14/09	10:12	8.7	1500.0	Slightly Turbid	None	6.54	5.293	0.56	263	14.9	-70.3	NA	N/A
11/14/09	10:32	8.75	1500.0	Clear	None	6.55	5.296	0.65	167	14.9	-64.7	NA	N/A
11/14/09	10:56	9.75	1500.0	Clear	None	6.45	5.310	0.68	54.5	15.01	-62.4	na	N/A
11/14/09	11:16	8.75	1500.0	Clear	None	6.41	5.321	0.69	47	15.06	-61	na	N/A

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
10:19	12:16	117	181.5	Clear	None	6.41	5.321	0.69	47	15.06	-61	na	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.

General Notes

Initial well development log

TETRA TECH NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Event: Site 21 - Investigation
Site Name: GREAT LAKES NTC - Site 21
Project No: 112G01797.0000.0320 (ED00000105)

Sample ID:	**NTC21MW0201**	Sampler:	Shannon Hill
Well ID:	NTC21-MW02	Well Type:	Monitoring Well
QC Duplicate ID:	NTC21-FD111609-01	MS/MSD:	N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	2.3
Top of Screen (ft-BTOR)	6	H&S PID Monitor Reading (ppm)	0.0
Bottom of Screen (ft-BTOR)	16	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	16	Sample Method	Low flow - peristaltic

Equipment

Water Quality Meter:	08K100392	Pump Control Box:	1470	Turbidity Meter:	ME 12230

Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11/16/09	11:27	2.55	225.0	Slightly Turbid	None	6.35	5.048	5.95	214	12.6	-36.1	na	N/A
11/16/09	11:37	3.15	200.0	Slightly Turbid	None	6.25	5.078	1.17	146	13.09	-29	na	N/A
11/16/09	11:47	3.15	175.0	Clear	None	6.22	5.025	0.81	86.5	12.9	-30.8	na	N/A
11/16/09	12:00	3.25	175.0	Clear	None	6.31	5.022	0.65	69	13.10	-37.2	na	N/A
11/16/09	12:10	3.3	175.0	Clear	None	6.35	5.022	0.58	46.1	13.04	-41.3	na	N/A
11/16/09	12:20	3.35	175.0	Clear	None	6.35	5.020	0.52	32.7	13.16	-43.7	na	N/A
11/16/09	12:30	3.4	175.0	Clear	None	6.35	5.028	0.51	20.6	13.27	-46	na	N/A
11/16/09	12:40	3.42	175.0	Clear	None	6.4	5.033	0.45	11.3	13.25	-49.8	NA	N/A
11/16/09	12:45	3.45	175.0	Clear	None	6.53	5.037	0.45	9.61	13.26	-52.6	NA	N/A

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
12:27	13:45	78	13.9	Clear	None	6.53	5.037	0.45	9.61	13.26	-52.6	NA	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	11/16/09	12:46	TCL VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000105-4
✓	11/16/09	12:46	TCL SVOCs/Herb/Pest/PCB	SW-846 8270C/8181/8081A/8082	4°C	6	Glass - Amber	1L	None	ED00000105-4
✓	11/16/09	12:46	TAL Metals (Total)	SW-846 6010B	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000105-4

General Notes

None

TETRA TECH NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Event: Site 21 - Investigation
Site Name: GREAT LAKES NTC - Site 21
Project No: 112G01797.0000.0320 (ED00000105)

Sample ID:	**NTC21-MW03-DEVELOPMENT**	Sampler:	Shannon Hill
Well ID:	NTC21-MW03	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	6.65
Top of Screen (ft-BTOR)	4	H&S PID Monitor Reading (ppm)	0.0
Bottom of Screen (ft-BTOR)	14	Purge Method	Submersible pump
Total Depth of Well (ft-BTOR)	14	Sample Method	high velocity purge

Equipment

Water Quality Meter:	N/A	Pump Control Box:	N/A	Turbidity Meter:	N/A

Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11/14/09	13:10	10	1900.0	Cloudy	None	7.30	0.980	7.1	1010	14.88	-6.3	na	N/A
11/14/09	13:30	15	1900.0	Cloudy	None	7.08	1.025	3.41	453	14.8	-26.6	na	N/A
11/14/09	13:55	18	0.0	Other	None	0	0	0	0	0	0	0	N/A
11/14/09	13:55	16.5	900.0	Cloudy	None	7.03	1.019	1.76	3153	14.92	-40.6	na	N/A
11/14/09	14:10	18	0.0	Highly Turbid	None	0	0	0	0	0	0	0	N/A
11/14/09	14:39	14.6	1600.0	Cloudy	None	7.09	1.006	39.1	4577	14.51	-19.1	na	N/A
11/14/09	14:54	18	0.0	Highly Turbid	None	0	0	0	0	0	0	0	N/A
11/14/09	15:12	16	500.0	Cloudy	None	7.03	1.004	3.37	2435	14.69	-23.2	na	N/A
11/14/09	15:21	18	0.0	Slightly Turbid	None	0	0	0	0	0	0	0	0

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
14:10	16:21	131	93.4	Slightly Turbid	None	0	0	0	0	0	0	0	0

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.

General Notes

Initial well development log

TETRA TECH NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Event: Site 21 - Investigation
Site Name: GREAT LAKES NTC - Site 21
Project No: 112G01797.0000.0320 (ED00000105)

Sample ID:	**NTC21MW0301**	Sampler:	Nicole Rochna
Well ID:	NTC21-MW03	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	1.33
Top of Screen (ft-BTOR)	4	H&S PID Monitor Reading (ppm)	NA
Bottom of Screen (ft-BTOR)	14	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	14	Sample Method	Low flow - peristaltic

Equipment

Water Quality Meter:	05D2372	Pump Control Box:	H07006412	Turbidity Meter:	ME 13089

Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11/16/09	8:50	1.33	350.0	Slightly Turbid	None	NA	NA	NA	NA	NA	NA	NA	N/A
11/16/09	9:00	1.35	300.0	Clear	None	7.28	3.761	0.43	24.5	11.46	-71.6	NA	N/A
11/16/09	9:10	1.35	250.0	Clear	None	7.29	3.753	0.33	14.1	11.42	-79.9	NA	N/A
11/16/09	9:20	1.35	300.0	Clear	None	7.28	3.777	0.39	6.37	11.43	-78.7	NA	N/A
11/16/09	9:30	1.35	200.0	Clear	None	7.29	3.778	0.28	5.00	11.32	-74.5	NA	N/A
11/16/09	9:40	1.35	250.0	Clear	None	7.30	3.791	0.24	6.52	11.42	-72.9	NA	N/A
11/16/09	9:50	1.35	200.0	Clear	None	7.29	3.788	0.25	6.50	11.38	-74.1	NA	N/A
11/16/09	10:00	1.35	250.0	Clear	None	7.26	3.794	0.24	6.37	11.45	-71.6	NA	N/A

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
9:50	11:00	70	17.5	Clear	None	7.26	3.794	0.24	6.37	11.45	-71.6	NA	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	11/16/09	10:05	TAL Metals (Total)	SW-846 6010B	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000105-4
✓	11/16/09	10:05	TCL VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000105-4
✓	11/16/09	10:05	TCL SVOCs/Herb/Pest/PCB	SW-846 8270C/8181/8081A/8082	4°C	6	Glass - Amber	1L	None	ED00000105-4

General Notes

None

TETRA TECH NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Event: Site 21 - Investigation
Site Name: GREAT LAKES NTC - Site 21
Project No: 112G01797.0000.0320 (ED00000105)

Sample ID:	**NTC21-MW04-DEVELOPMENT**	Sampler:	Nicole Rochna
Well ID:	NTC21-MW04	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	1.13
Top of Screen (ft-BTOR)	10	H&S PID Monitor Reading (ppm)	NA
Bottom of Screen (ft-BTOR)	20	Purge Method	Submersible pump
Total Depth of Well (ft-BTOR)	20	Sample Method	High velocity developement purge

Equipment

Water Quality Meter:	05D2372	Pump Control Box:	N/A	Turbidity Meter:	ME 13089

Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11/14/09	13:05	1.13	600.0	Highly Turbid	None	NA	NA	NA	NA	NA	NA	NA	N/A
11/14/09	13:35	1.25	600.0	Slightly Turbid	None	7.08	4.456	0.15	133	14.29	-100.7	NA	N/A
11/14/09	14:00	1.25	600.0	Cloudy	None	7.30	4.249	0.12	2706	13.24	-109.3	NA	N/A
11/14/09	14:25	1.50	1000.0	Clear	None	7.29	4.435	0.08	19.1	12.66	-113.2	NA	N/A
11/14/09	14:45	1.50	1000.0	Clear	None	7.15	4.450	0.07	18.1	12.62	-114.9	NA	N/A

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
14:05	15:45	100	78.0	Clear	None	7.15	4.450	0.07	18.1	12.62	-114.9	NA	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.

General Notes

Initial well development log

TETRA TECH NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Event: Site 21 - Investigation
Site Name: GREAT LAKES NTC - Site 21
Project No: 112G01797.0000.0320 (ED00000105)

Sample ID:	**NTC21MW0401**	Sampler:	Nicole Rochna
Well ID:	NTC21-MW04	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	3.37
Top of Screen (ft-BTOR)	10	H&S PID Monitor Reading (ppm)	NA
Bottom of Screen (ft-BTOR)	20	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	20	Sample Method	Low flow - peristaltic

Equipment

Water Quality Meter:	05D2372	Pump Control Box:	ME 13089	Turbidity Meter:	H07006412

Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11/16/09	12:25	3.37	175.0	Clear	None	NA	NA	NA	NA	NA	NA	NA	N/A
11/16/09	12:30	4.29	175.0	Clear	None	7.10	1.005	1.82	37.1	13.00	21.1	NA	N/A
11/16/09	12:35	4.98	150.0	Clear	None	7.18	0.992	1.87	38.2	12.98	13.2	NA	N/A
11/16/09	12:40	5.35	150.0	Clear	None	7.20	0.987	1.91	38.1	12.95	12.5	NA	N/A
11/16/09	12:45	5.65	150.0	Clear	None	7.20	0.969	1.96	64.0	12.69	3.8	NA	N/A
11/16/09	12:50	6.25	150.0	Clear	None	7.14	0.969	1.88	75.8	12.92	0.9	NA	N/A
11/16/09	12:55	6.72	150.0	Clear	None	7.13	0.973	1.73	67.3	13.04	0.4	NA	N/A
11/16/09	13:00	6.92	150.0	Clear	None	7.14	0.970	1.81	51.4	12.94	-1.8	NA	N/A
11/16/09	13:05	7.31	150.0	Clear	None	7.10	0.970	1.55	43.0	12.91	-16.3	NA	N/A

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
13:25	14:05	40	6.125	Clear	None	7.10	0.970	1.55	43.0	12.91	-16.3	NA	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	11/16/09	13:10	TAL Metals (Dissolved)	SW-846 6010B - Filtered	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000105-4
✓	11/16/09	13:10	TCL SVOCs/Herb/Pest/PCB	SW-846 8270C/8181/8081A/8082	4°C	6	Glass - Amber	1L	None	ED00000105-4
✓	11/16/09	13:10	TAL Metals (Total)	SW-846 6010B	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000105-4
✓	11/16/09	13:10	TCL VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000105-4

General Notes

None

TETRA TECH NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Event: Site 21 - Investigation
Site Name: GREAT LAKES NTC - Site 21
Project No: 112G01797.0000.0320 (ED00000105)

Sample ID:	**NTC21-MW05-DEVELOPMENT**	Sampler:	Nicole Rochna
Well ID:	NTC21-MW05	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	2.80
Top of Screen (ft-BTOR)	3	H&S PID Monitor Reading (ppm)	NA
Bottom of Screen (ft-BTOR)	13	Purge Method	Submersible pump
Total Depth of Well (ft-BTOR)	13	Sample Method	High velocity developement purge

Equipment

Water Quality Meter:	05D2372	Pump Control Box:	N/A	Turbidity Meter:	ME 13089

Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11/14/09	15:20	2.80	700.0	Highly Turbid	None	NA	NA	NA	NA	NA	NA	NA	N/A
11/14/09	15:50	3.7	800.0	Slightly Turbid	None	7.00	5.041	0.49	196	17.50	-5.1	NA	N/A
11/14/09	16:10	4.51	1250.0	Cloudy	None	6.90	4.499	0.21	257	16.14	-30.0	NA	N/A
11/14/09	16:20	3.61	1000.0	Slightly Turbid	None	6.90	4.517	0.16	61.8	16.44	-27.5	NA	N/A
11/14/09	16:30	3.51	1000.0	Clear	None	6.87	4.590	0.26	22.1	16.42	-25.1	NA	N/A

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
15:20	16:30	70	69.0	Clear	None	6.87	4.590	0.26	22.1	16.42	-25.1	NA	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.

General Notes

Initial well development log

TETRA TECH NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Event: Site 21 - Investigation
Site Name: GREAT LAKES NTC - Site 21
Project No: 112G01797.0000.0320 (ED00000105)

Sample ID:	**NTC21MW0501**	Sampler:	Shannon Hill
Well ID:	NTC21-MW05	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	MS/MSD

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	2.91
Top of Screen (ft-BTOR)	3	H&S PID Monitor Reading (ppm)	0.0
Bottom of Screen (ft-BTOR)	13	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	13	Sample Method	Low flow - peristaltic

Equipment

Water Quality Meter:	08K100392	Pump Control Box:	1470	Turbidity Meter:	ME 12230

Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11/15/09	15:23	3.03	200.0	Slightly Turbid	None	6.8	8.986	1.32	266	14.56	41.4	na	N/A
11/15/09	15:33	3.05	200.0	Clear	None	6.81	9.039	1.19	127	14.72	32.4	na	N/A
11/15/09	15:44	3.1	200.0	Clear	None	6.81	8.9	1.12	80.4	14.71	27.3	na	N/A
11/15/09	15:53	3.1	200.0	Clear	None	6.8	8.622	0.85	41.6	14.79	20.6	na	N/A
11/15/09	16:03	3.1	200.0	Clear	None	6.80	8.161	0.70	25	14.79	15.9	na	N/A
11/15/09	16:13	3.1	200.0	Clear	None	6.97	7.588	0.56	8.08	14.8	10	na	N/A
11/15/09	16:18	3.1	200.0	Clear	None	6.79	7.443	0.6	7.31	14.81	8.4	na	N/A
11/15/09	16:23	3.1	200.0	Clear	None	6.78	7.203	0.57	5.99	14.83	6.5	na	N/A

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
15:23	16:23	60	12.0	Clear	None	6.78	7.203	0.57	5.99	14.83	6.5	na	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	11/15/09	16:26	TCL SVOCs/Herb/Pest/ PCB	SW-846 8270C/8181/8081A/8082	4°C	18	Glass - Amber	1L	MS/MSD	ED00000105-4
✓	11/15/09	16:26	TAL Metals (Total)	SW-846 6010B	4°C/HNO3	3	Plastic - PE	250ml	MS/MSD	ED00000105-4
✓	11/15/09	16:26	Dioxins/Furans	SW-846 8290	4°C	6	Glass - Amber	1L	MS/MSD	ED00000105-5
✓	11/15/09	16:26	TCL VOCs	SW-846 8260B	4°C/HCL	9	Glass - Clear	40ml vials	MS/MSD	ED00000105-4

General Notes

None

TETRA TECH NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Event: Site 21 - Investigation
Site Name: GREAT LAKES NTC - Site 21
Project No: 112G01797.0000.0320 (ED00000105)

Sample ID:	**NTC21-MW06-DEVELOPMENT**	Sampler:	Nicole Rochna
Well ID:	NTC21-MW06	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	6.21
Top of Screen (ft-BTOR)	4	H&S PID Monitor Reading (ppm)	NA
Bottom of Screen (ft-BTOR)	14	Purge Method	Submersible pump
Total Depth of Well (ft-BTOR)	14	Sample Method	High velocity developement purge

Equipment

Water Quality Meter:	05D2372	Pump Control Box:	N/A	Turbidity Meter:	ME 13089

Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11/15/09	7:25	6.21	1500.0	Highly Turbid	None	NA	NA	NA	NA	NA	NA	NA	N/A
11/15/09	7:50	8.05	1500.0	Cloudy	None	7.17	2.129	2.86	193	14.46	21.2	NA	N/A
11/15/09	8:15	8.50	1500.0	Slightly Turbid	None	7.16	2.154	2.47	165	14.48	33.2	NA	N/A
11/15/09	8:40	8.65	1500.0	Slightly Turbid	None	7.15	2.150	2.58	62.5	14.50	42.2	NA	N/A
11/15/09	9:05	9.30	1500.0	Clear	None	7.32	2.149	2.60	33.1	14.51	45.6	NA	N/A

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
8:25	10:05	100	150.0	Clear	None	7.32	2.149	2.60	33.1	14.51	45.6	NA	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.

General Notes

Initial well development log

TETRA TECH NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Event: Site 21 - Investigation
Site Name: GREAT LAKES NTC - Site 21
Project No: 112G01797.0000.0320 (ED00000105)

Sample ID:	**NTC21MW0601**	Sampler:	Nicole Rochna
Well ID:	NTC21-MW06	Well Type:	Monitoring Well
QC Duplicate ID:	N/A	MS/MSD:	N/A

Well Information

Well Diameter (in.)	2	Static Water Level (ft-BTOR)	6.25
Top of Screen (ft-BTOR)	4	H&S PID Monitor Reading (ppm)	NA
Bottom of Screen (ft-BTOR)	14	Purge Method	Low flow - peristaltic
Total Depth of Well (ft-BTOR)	14	Sample Method	Low flow - peristaltic

Equipment

Water Quality Meter:	05D2372	Pump Control Box:	H07006412	Turbidity Meter:	ME 13089

Purge Information

Date	Time	Level (ft-BTOR)	Rate (ml/min)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
11/17/09	12:40	6.25	225.0	Slightly Turbid	None	NA	NA	NA	NA	NA	NA	NA	N/A
11/17/09	12:50	6.38	200.0	Clear	None	7.25	1.930	1.61	15.1	13.43	67.9	NA	N/A
11/17/09	13:00	6.38	200.0	Clear	None	7.15	1.930	1.90	8.64	13.42	71.3	NA	N/A
11/17/09	13:10	6.39	200.0	Clear	None	7.13	1.923	1.80	6.84	13.41	68.3	NA	N/A
11/17/09	13:20	6.39	200.0	Clear	None	7.12	1.925	2.44	4.51	13.31	67.4	NA	N/A
11/17/09	13:30	6.39	200.0	Clear	None	7.12	1.933	1.77	6.04	13.39	67.1	NA	N/A
11/17/09	13:40	6.39	200.0	Clear	None	7.10	1.923	1.46	5.71	13.34	65.7	NA	N/A
11/17/09	13:50	6.39	200.0	Clear	None	7.09	1.919	1.58	4.07	13.33	65.1	NA	N/A
11/17/09	14:00	6.39	200.0	Clear	None	7.09	1.919	1.56	5.86	13.37	64.3	NA	N/A

Final Purge / Sample Data

Start Purge	End Purge	Duration (min.)	Total Vol. (L)	Color	Odor	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp (°C)	ORP (mV)	Salinity (%)	Other
13:40	15:00	80	16.0	Clear	None	7.09	1.919	1.56	5.86	13.37	64.3	NA	N/A

Laboratory Analysis

Coll.	Date	Time	Description	Analysis	Preservative	No.	Type	Vol.	COC Notes	Chain No.
✓	11/17/09	14:05	TCL VOCs	SW-846 8260B	4°C/HCL	3	Glass - Clear	40ml vials	None	ED00000105-6
✓	11/17/09	14:05	TCL SVOCs/Herb/Pest/ PCB	SW-846 8270C/8181/8081A/808 2	4°C	6	Glass - Amber	1L	None	ED00000105-6
✓	11/17/09	14:05	TAL Metals (Total)	SW-846 6010B	4°C/HNO3	1	Plastic - PE	250ml	None	ED00000105-6
✗	N/A	N/A	TAL Metals (Dissolved)	SW-846 6010B - Filtered	4°C/HNO3	1	Plastic - PE	250ml	None	N/A

General Notes

None

B-7 SAMPLE LOG SHEETS – IDW

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

Site 9 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**QC Sample ID #**	IDW-AQ-092909-01	**Created By**	John Wright
TtNUS Project #	112G01489	**Corresponding Sample ID**		**Created Date**	9/29/09
Task/Contract #	0510	**QA Sample Type**	IDW Log	**Modified By**	Shannon Hill
WBS Code #		**Sample Location**	QC	**Modified Date**	9/29/09
Status	Complete	**Sampled By**	Shannon Hill	**Printed By**	Bob Davis
		Concentration	Low concentration	**Printed Date**	3/19/10

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative	Comments	Chain of Custody #
✓	9/29/09	18:21	1311/8260B	TCLP VOC	3	Glass - Clear	40ml vials	AQ	4°C/HCL	IDW Water	ED00000104-4
✓	9/29/09	18:21	1311/8270C, 1311/8081A, 1311/8151, 6010B/7471A, 7.3.4, 1020A, 9066, 9095B, SW8082, 110.2, 140.2, 9045C	TCLP SVOC, TCLP Pest, TCLP Herb, TCLP Metals, Reactive Sulfide, Flashpoint, Phenolics, paint filter, PCBs, Color, Odor, Density, Corrosivity as pH	6	Glass - Amber	1L	AQ	4°C	IDW Water	ED00000104-4
✓	9/29/09	18:21	9012A	Cyanide	1	Plastic - PE	250ml	AQ	4° C/NAOH	IDW Water	ED00000104-4

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

Site 9 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**QC Sample ID #**	IDW-111709	**Created By**	Shannon Hill
TtNUS Project #	112G01489	**Corresponding Sample ID**		**Created Date**	11/17/09
Task/Contract #	0510	**QA Sample Type**	IDW Log	**Modified By**	Shannon Hill
WBS Code #		**Sample Location**	QC	**Modified Date**	11/17/09
Status	Complete	**Sampled By**	Shannon Hill	**Printed By**	Bob Davis
		Concentration	Low concentration	**Printed Date**	3/19/10

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative	Comments	Chain of Custody #
✓	11/17/09	16:00	1311/8270C, 1311/8081A, 1311/8151, 6010B/7471A, 7.3.4, 1020A, 9066, 9095B, SW8082, 110.2, 140.2, 9045C	TCLP SVOC, TCLP Pest, TCLP Herb, TCLP Metals, Reactive Sulfide, Flashpoint, Phenolics, paint filter, PCBs, Color, Odor, Density, Corrosivity as pH	6	Glass - Amber	1L	AQ	4°C		ED000001[illegible] 8
✓	11/17/09	16:00	SW-846 8260B	TCL VOCs	3	Glass - Clear	40ml vials	AQ	4°C/HCL		ED00000104-8
✓	11/17/09	16:00	9012A	Cyanide	1	Plastic - PE	250ml	AQ	4° C/NAOH		ED00000104-8

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

Site 9 - Investigation - GREAT LAKES NTC

·oject Information

Facility Name	GREAT LAKES NTC	**Sample ID #**	IDW-SO-092909-01	**Created By**	John Wright
TtNUS Project #	112G01489	**Sample Location ID**	QC	**Created Date**	9/29/09
Task/Contract #	0510	**Sampled By**	Shannon Hill	**Modified By**	John Wright
WBS Code #		**Concentration**	Low concentration	**Modified Date**	3/8/10
QA Sample Type				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	9/29/09	18:50	1311/8260B, 1311/8270C, 1311/8081A, 1311/8151, 6010B/7471A, 8082A, 7.3.4, 9012, 9066, Color EPA 110, 140.1, 1020A, 9045D	TCLP VOC, TCLP SVOC, TCLP Pest, TCLP Herb, TCLP Metals, PCB, Reactive Sulfide, Phenolics, Color, Odor, Density, % Moisture, Flash Point, Corrosivity as pH	4°C	7	Glass - Clear	4 oz. wide-mouth w/Teflon cap	IDW Soils	ED00000104-4
✗			ASTM D422 (or as instructed by TtNUS)	Grain Size	4°C	1	Glass - Clear	4 oz. wide-mouth w/Teflon cap	IDW Soils	

General Observations and Notes

No Notes

- End of Report -

B-8 SAMPLE LOG SHEETS – QA/QC

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**QC Sample ID #**	TB-092609-01	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Corresponding Sample ID**		**Created Date**	9/26/09
Task/Contract #	0064	**QA Sample Type**	Temperature Blank	**Modified By**	John Wright
WBS Code #		**Sample Location**	QC	**Modified Date**	9/30/09
Status	Complete	**Sampled By**	Shannon Hill	**Printed By**	Bob Davis
		Concentration	Low concentration	**Printed Date**	3/19/10

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative	Comments	Chain of Custody #
✓	9/26/09	08:00	SW-846 8260B	TCL VOCs	2	Glass - Clear	40ml vials	AQ	4°C/HCL	Trip Blank	ED00000105-1

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**QC Sample ID #**	FD-092709-01	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Corresponding Sample ID**	NTC21SB15-SO-0204	**Created Date**	9/27/09
Task/Contract #	0064	**QA Sample Type**	Field Duplicate	**Modified By**	Shannon Hill
WBS Code #		**Sample Location**	QC	**Modified Date**	9/27/09
Status	Complete	**Sampled By**	Shannon Hill	**Printed By**	Bob Davis
		Concentration	Low concentration	**Printed Date**	3/19/10

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative	Comments	Chain of Custody #
✓	9/27/09	00:00	SW-846 8260B	TCL VOCs	4	TerraCore	TerraCore	SO	4° C/HNaO4S/MeO H		ED00000105-1
✓	9/27/09	00:00	SW-846 8270C/8181/8081A/8082/6010 B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	SO	4°C		ED000001-1

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

ᵖroject Information

Facility Name	GREAT LAKES NTC	**QC Sample ID #**	FD-092609-01	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Corresponding Sample ID**	NTC21SB18-SO-0507	**Created Date**	9/26/09
Task/Contract #	0064	**QA Sample Type**	Field Duplicate	**Modified By**	Shannon Hill
WBS Code #		**Sample Location**	QC	**Modified Date**	9/26/09
Status	Complete	**Sampled By**	Shannon Hill	**Printed By**	Bob Davis
		Concentration	Low concentration	**Printed Date**	3/19/10

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative	Comments	Chain of Custody #
✓	9/26/09	00:00	SW-846 8260B	TCL VOCs	4	TerraCore	TerraCore	SO	4° C/HNaO4S/MeOH		ED00000105-1
✓	9/26/09	00:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	SO	4°C		ED00000105-1

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**QC Sample ID #**	FD-092609-02	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Corresponding Sample ID**	NTC21SB09-SO-0001	**Created Date**	9/26/09
Task/Contract #	0064	**QA Sample Type**	Field Duplicate	**Modified By**	Shannon Hill
WBS Code #		**Sample Location**	QC	**Modified Date**	9/26/09
Status	Complete	**Sampled By**	Shannon Hill	**Printed By**	Bob Davis
		Concentration	Low concentration	**Printed Date**	3/19/10

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative	Comments	Chain of Custody #
✓	9/26/09	00:00	SW-846 8290	Dioxins/Furans	2	Glass - Amber	4 oz. wide-mouth w/Teflon cap	SO	4°C		ED00000105-2
✓	9/26/09	00:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	SO	4°C		ED000001[illegible]-1
✓	9/26/09	00:00	SW-846 8260B	TCL VOCs	4	TerraCore	TerraCore	SO	4° C/HNaO4S/MeOH		ED00000105-1

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

'roject Information

Facility Name	GREAT LAKES NTC	**QC Sample ID #**	TB-092709-01	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Corresponding Sample ID**		**Created Date**	9/27/09
Task/Contract #	0064	**QA Sample Type**	Trip Blank	**Modified By**	Shannon Hill
WBS Code #		**Sample Location**	QC	**Modified Date**	9/27/09
Status	Complete	**Sampled By**	Shannon Hill	**Printed By**	Bob Davis
		Concentration	Low concentration	**Printed Date**	3/19/10

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative	Comments	Chain of Custody #
✓	9/27/09	08:00	SW-846 8260B	TCL VOCs	2	Glass - Clear	40ml vials	AQ	4°C/H3PO4	Trip Blank	ED00000105-1

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**QC Sample ID #**	TB-092809-01	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Corresponding Sample ID**		**Created Date**	9/28/09
Task/Contract #	0064	**QA Sample Type**	Trip Blank	**Modified By**	Shannon Hill
WBS Code #		**Sample Location**	QC	**Modified Date**	9/28/09
Status	Complete	**Sampled By**	Shannon Hill	**Printed By**	Bob Davis
		Concentration	Low concentration	**Printed Date**	3/19/10

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative	Comments	Chain of Custody #
✓	9/28/09	08:00	SW-846 8260B	TCL VOCs	2	Glass - Clear	40ml vials	AQ	4°C/HCL	Trip Blank	ED00000105-1

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

roject Information

Facility Name	GREAT LAKES NTC	**QC Sample ID #**	FD-092809-01	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Corresponding Sample ID**	NTC21SB05-SO-0001	**Created Date**	9/28/09
Task/Contract #	0064	**QA Sample Type**	Field Duplicate	**Modified By**	Shannon Hill
WBS Code #		**Sample Location**	QC	**Modified Date**	9/28/09
Status	Complete	**Sampled By**	Shannon Hill	**Printed By**	Bob Davis
		Concentration	Low concentration	**Printed Date**	3/19/10

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative	Comments	Chain of Custody #
✓	9/28/09	00:00	SW-846 8260B	TCL VOCs	4	TerraCore	TerraCore	SO	4° C/HNaO4S/MeOH		ED00000105-1
✓	9/28/09	00:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	SO	4°C		ED00000105-1

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**QC Sample ID #**	TB-092909-01	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Corresponding Sample ID**		**Created Date**	9/29/09
Task/Contract #	0064	**QA Sample Type**	Trip Blank	**Modified By**	John Wright
WBS Code #		**Sample Location**	QC	**Modified Date**	9/30/09
Status	Complete	**Sampled By**	Shannon Hill	**Printed By**	Bob Davis
		Concentration	Low concentration	**Printed Date**	3/19/10

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative	Comments	Chain of Custody #
✓	9/29/09	10:28	SW-846 8260B	TCL VOCs	2	Glass - Clear	40ml vials	AQ	4°C/HCL	Trip Blank	ED00000105-1

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

'roject Information

Facility Name	GREAT LAKES NTC	**QC Sample ID #**	SB-092909-01	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Corresponding Sample ID**		**Created Date**	9/29/09
Task/Contract #	0064	**QA Sample Type**	Source Water Blank	**Modified By**	Shannon Hill
WBS Code #		**Sample Location**	QC	**Modified Date**	9/29/09
Status	Complete	**Sampled By**	Shannon Hill	**Printed By**	Bob Davis
		Concentration	Low concentration	**Printed Date**	3/19/10

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative	Comments	Chain of Custody #
✓	9/29/09	10:31	SW-846 6010B	TAL Metals (Total)	1	Plastic - Bell Arte HDPE	250ml	AQ	4° C/HNO3		ED00000105-1
✓	9/29/09	10:31	SW-846 8260B	TCL VOCs	3	Glass - Clear	40ml vials	AQ	4°C/HCL		ED00000105-1
✓	9/29/09	10:31	SW-846 8290	Dioxins/Furans	2	Glass - Amber	1L	AQ	4°C		ED00000105-2
✓	9/29/09	10:31	SW-846 8270C/8181/8081A/8082	TCL SVOCs/Herb/Pest/PCB	6	Glass - Amber	1L	AQ	4°C		ED00000105-1

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**QC Sample ID #**	RB-092909-01	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Corresponding Sample ID**		**Created Date**	9/29/09
Task/Contract #	0064	**QA Sample Type**	Rinsate Blank	**Modified By**	John Wright
WBS Code #		**Sample Location**	QC	**Modified Date**	9/29/09
Status	Complete	**Sampled By**	Shannon Hill	**Printed By**	Bob Davis
		Concentration	Low concentration	**Printed Date**	3/19/10

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative	Comments	Chain of Custody #
✓	9/29/09	11:26	SW-846 8260B	TCL VOCs	3	Glass - Clear	40ml vials	AQ	4°C/HCL		ED00000105-1
✓	9/29/09	11:26	SW-846 8270C/8181/8081A/8082	TCL SVOCs/Herb/Pest/PCB	6	Glass - Amber	1L	AQ	4°C	from deconned shoe of DPT rig	ED00000105-1
✓	9/29/09	11:26	SW-846 8290	Dioxins/Furans	2	Glass - Amber	1L	AQ	4°C		ED0000010[illegible]-2
✓	9/29/09	11:26	SW-846 6010B	TAL Metals (Total)	1	Plastic - Bell Arte HDPE	250ml	AQ	4° C/HNO3		ED00000105-1

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

-oject Information

Facility Name	GREAT LAKES NTC	**QC Sample ID #**	RB-092909-02	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Corresponding Sample ID**		**Created Date**	9/29/09
Task/Contract #	0064	**QA Sample Type**	Rinsate Blank	**Modified By**	John Wright
WBS Code #		**Sample Location**	QC	**Modified Date**	9/29/09
Status	Complete	**Sampled By**	Shannon Hill	**Printed By**	Bob Davis
		Concentration	Low concentration	**Printed Date**	3/19/10

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative	Comments	Chain of Custody #
✓	9/29/09	13:02	SW-846 8270C/8181/8081A/8082	TCL SVOCs/Herb/Pest/PCB	6	Glass - Amber	1L	AQ	4°C	DPT disposible sleeve	ED00000105-1
✓	9/29/09	13:02	SW-846 8260B	TCL VOCs	3	Glass - Clear	40ml vials	AQ	4°C/HCL		ED00000105-1
✓	9/29/09	13:02	SW-846 6010B	TAL Metals (Total)	1	Plastic - Bell Arte HDPE	250ml	AQ	4° C/HNO3		ED00000105-1

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**QC Sample ID #**	NTC21-FD111609-01	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Corresponding Sample ID**	NTC21MW0201	**Created Date**	11/16/09
Task/Contract #	0064	**QA Sample Type**	Field Duplicate	**Modified By**	Shannon Hill
WBS Code #		**Sample Location**	QC	**Modified Date**	11/16/09
Status	Complete	**Sampled By**	Shannon Hill	**Printed By**	Bob Davis
		Concentration	Low concentration	**Printed Date**	3/19/10

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative	Comments	Chain of Custody #
✓	11/16/09	00:00	SW-846 8270C/8181/8081A/8082	TCL SVOCs/Herb/Pest/PCB	6	Glass - Amber	1L	GW	4°C		ED00000105-4
✓	11/16/09	00:00	SW-846 6010B	TAL Metals (Total)	1	Plastic - PE	250ml	GW	4° C/HNO3		ED00000105-4
✓	11/16/09	00:00	SW-846 8260B	TCL VOCs	3	Glass - Clear	40ml vials	GW	4°C/HCL		ED00000.4

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

Site 21 - Investigation - GREAT LAKES NTC

oject Information

Facility Name	GREAT LAKES NTC	**QC Sample ID #**	TB-111709-01	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Corresponding Sample ID**		**Created Date**	11/17/09
Task/Contract #	0064	**QA Sample Type**	Field Blank	**Modified By**	Shannon Hill
WBS Code #		**Sample Location**	QC	**Modified Date**	12/23/09
Status	Complete	**Sampled By**	Shannon Hill	**Printed By**	Bob Davis
		Concentration	-Select-	**Printed Date**	3/19/10

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative	Comments	Chain of Custody #
✓	11/17/09	08:00	SW-846 8260B	TCL VOCs	2	Glass - Clear	40ml vials	AQ	4°C/HCL		ED00000105-6

B-9 CALIBRATION LOG SHEETS

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Instrument**	MiniRAE 2000	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Manufacturer**	RAE Systems	**Created Date**	11/10/09
Task/Contract #	0064	**Serial Number**	110-011512	**Modified By**	Shannon Hill
WBS Code #	0000.0320			**Modified Date**	11/10/09
Client				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Calibration Records

Date	**Calibrator**	**Isobutylene (100 ppm)**	**Comments**
9/28/09	Shannon Hill	Pre: 100 Post: 100 Std: Exp:	
9/27/09	Shannon Hill	Pre: 102 Post: 101 Std: Exp:	

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Instrument**	MiniRAE 2000	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**Manufacturer**	RAE Systems	**Created Date**	12/7/09
Task/Contract #	0064	**Serial Number**	110-007957	**Modified By**	Shannon Hill
WBS Code #	0000.0320			**Modified Date**	12/7/09
Client				**Printed By**	Bob Davis
Status	Complete			**Printed Date**	3/19/10

Calibration Records

Date	Calibrator	Ambient air (ppm)	Isobutylene (100 ppm)	Comments
11/17/09	Shannon Hill	Pre: 0.0 Post: 0.0 Std: Exp:	Pre: 99 Post: 100 Std: 09-3734 Exp: 2.12.11	
11/16/09	Shannon Hill	Pre: 0.0 Post: 0.0 Std: Exp:	Pre: 98 Post: 101 Std: 09-3734 Exp: 2.12.11	
11/15/09	Shannon Hill	Pre: 0.0 Post: 0.0 Std: Exp:	Pre: 100 Post: 101 Std: 09-3734 Exp: 2.12.11	
11/14/09	Shannon Hill	Pre: 0.0 Post: 0.0 Std: Exp:	Pre: 99 Post: 100 Std: 09-3734 Exp: 2.12.11	

B-10 CHAIN OF CUSTODY FORMS

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Project Manager (PM)**	Biff Cummings	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**PM Telephone**		**Created Date**	9/29/09
Task/Contract #	0064	**Field Op Leader (FOL)**	Shannon Hill	**Modified By**	
WBS Code #	0000.0320	**FOL Phone**		**Modified Date**	
Chain of Custody ID	ED00000105-1	**Carrier**	Airborne Express	**Printed By**	Bob Davis
		Carrier/Waybill No.	8631 2526 8200	**Printed Date**	9/30/09

Chain of Custody Information

Chain of Custody #	**ED00000105-1**	**Lab Name**	Empirical Laboritories, LLC.	**Relenquished By**	Shannon Hill
Carrier	Airborne Express	**Address**	227 French Landing Drive	**Date**	09/29/2009
Carrier/Waybill No.	8631 2526 8200	**City, State, Zip**	Nashville, TN 37228	**Time**	13:11
		Lab Contact	Janice Shilling	**Received By:**	Airborne Express
		Lab Telephone	615.345.1115 ext. 256	**Date**	9/29/09
				Time	14:11

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
9/26/09	FD-092609-01	00:00	SW-846 8260B	TCL VOCs	QC	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/26/09	FD-092609-01	00:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	QC	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	

9/26/09	FD-092609-02	00:00	SW-846 8260B	TCL VOCs	QC	SO	4° C/HNaO4S/MeO H	4	TerraCore	TerraCore
9/26/09	FD-092609-02	00:00	SW-846 8270C/8181/80 81A/8082/6010 B	TCL SVOCs/Herb/Pe st/PCB/TAL Metals	QC	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap
9/26/09	NTC21SB09-SO-0001	16:20	SW-846 8260B	TCL VOCs	NTC21SB09	SO	4° C/HNaO4S/MeO H	4	TerraCore	TerraCore
9/26/09	NTC21SB09-SO-0001	16:20	SW-846 8270C/8181/80 81A/8082/6010 B	TCL SVOCs/Herb/Pe st/PCB/TAL Metals	NTC21SB09	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap
9/26/09	NTC21SB09-SO-0204	16:28	SW-846 8260B	TCL VOCs	NTC21SB09	SO	4° C/HNaO4S/MeO H	4	TerraCore	TerraCore
9/26/09	NTC21SB09-SO-0204	16:28	SW-846 8270C/8181/80 81A/8082/6010 B	TCL SVOCs/Herb/Pe st/PCB/TAL Metals	NTC21SB09	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

Site 21 - Investigation - GREAT LAKES NTC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
9/26/09	NTC21SB10-SO-0001	18:36	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB10	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/26/09	NTC21SB10-SO-0001	18:36	SW-846 8260B	TCL VOCs	NTC21SB10	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/26/09	NTC21SB10-SO-0406	18:40	SW-846 8260B	TCL VOCs	NTC21SB10	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/26/09	NTC21SB10-SO-0406	18:40	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB10	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/26/09	NTC21SB11-SO-0001	18:10	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB11	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/26/09	NTC21SB11-SO-0001	18:10	SW-846 8260B	TCL VOCs	NTC21SB11	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/26/09	NTC21SB11-SO-0204	18:12	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB11	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/26/09	NTC21SB11-SO-0204	18:12	SW-846 8260B	TCL VOCs	NTC21SB11	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/26/09	NTC21SB12-SO-0001	14:00	SW-846 8260B	TCL VOCs	NTC21SB12	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/26/09	NTC21SB12-	14:00	SW-846 8270C/8181/80	TCL SVOCs/Herb/Pe	NTC21SB12	SO	4°C	3	Glass - Clear	4 oz. wide-mouth	

	SO-0001		81A/8082/6010 B	st/PCB/TAL Metals						w/Teflon cap	
9/26/09	NTC21SB12-SO-0204	14:10	SW-846 8270C/8181/80 81A/8082/6010 B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB12	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/26/09	NTC21SB12-SO-0204	14:10	SW-846 8260B	TCL VOCs	NTC21SB12	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/26/09	NTC21SB17-SO-0001	13:26	SW-846 8270C/8181/80 81A/8082/6010 B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB17	SO	4° C/HNaO4S/MeOH	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/26/09	NTC21SB17-SO-0001	13:26	SW-846 8260B	TCL VOCs	NTC21SB17	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/26/09	NTC21SB17-SO-0507	13:32	SW-846 8270C/8181/80 81A/8082/6010 B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB17	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/26/09	NTC21SB17-SO-0507	13:32	SW-846 8260B	TCL VOCs	NTC21SB17	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/26/09	NTC21SB18-SO-0001	12:47	SW-846 8270C/8181/80 81A/8082/6010 B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB18	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/26/09	NTC21SB18-SO-0001	12:47	SW-846 8260B	TCL VOCs	NTC21SB18	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/26/09	NTC21SB18-SO-0507	12:59	SW-846 8270C/8181/80 81A/8082/6010 B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB18	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/26/09	NTC21SB18-SO-0507	12:59	SW-846 8260B	TCL VOCs	NTC21SB18	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

Site 21 - Investigation - GREAT LAKES NTC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
9/26/09	NTC21SB20-SO-0001	16:57	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB20	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/26/09	NTC21SB20-SO-0001	16:57	SW-846 8260B	TCL VOCs	NTC21SB20	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/26/09	NTC21SB20-SO-0406	17:02	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB20	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/26/09	NTC21SB20-SO-0406	17:02	SW-846 8260B	TCL VOCs	NTC21SB20	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/26/09	NTC21SB21-SO-0001	15:10	SW-846 8260B	TCL VOCs	NTC21SB21	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/26/09	NTC21SB21-SO-0001	15:10	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB21	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/26/09	NTC21SB21-SO-0608	15:20	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB21	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/26/09	NTC21SB21-SO-0608	15:20	SW-846 8260B	TCL VOCs	NTC21SB21	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/26/09	TB-092609-01	08:00	SW-846 8260B	TCL VOCs	QC	AQ	4°C/HCL	2	Glass - Clear	40ml vials	Trip Blank
9/27/09	FD-092709-01	00:00	SW-846 8260B	TCL VOCs	QC	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
			SW-846	TCL							

9/27/09	FD-092709-01	00:00	8270C/8181/8081A/8082/6010B	SVOCs/Herb/Pest/PCB/TAL Metals	QC	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/27/09	NTC21SB04-SO-0001	12:50	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB04	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/27/09	NTC21SB04-SO-0001	12:50	SW-846 8260B	TCL VOCs	NTC21SB04	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/27/09	NTC21SB04-SO-0406	13:00	SW-846 8260B	TCL VOCs	NTC21SB04	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/27/09	NTC21SB04-SO-0406	13:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB04	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/27/09	NTC21SB06-SO-0001	15:10	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB06	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/27/09	NTC21SB06-SO-0001	15:10	SW-846 8260B	TCL VOCs	NTC21SB06	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/27/09	NTC21SB06-SO-0204	15:20	SW-846 8260B	TCL VOCs	NTC21SB06	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/27/09	NTC21SB06-SO-0204	15:20	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB06	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/27/09	NTC21SB07-SO-0001	10:40	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB07	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	

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Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

Site 21 - Investigation - GREAT LAKES NTC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
9/27/09	NTC21SB07-SO-0001	10:40	SW-846 8260B	TCL VOCs	NTC21SB07	SO	4° C/HNaO4S/MeO H	4	TerraCore	TerraCore	
9/27/09	NTC21SB07-SO-0204	10:50	SW-846 8270C/8181/8081A/8082/6010 B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB07	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/27/09	NTC21SB07-SO-0204	10:50	SW-846 8260B	TCL VOCs	NTC21SB07	SO	4° C/HNaO4S/MeO H	4	TerraCore	TerraCore	
9/27/09	NTC21SB13-SO-0001	09:00	SW-846 8260B	TCL VOCs	NTC21SB13	SO	4° C/HNaO4S/MeO H	4	TerraCore	TerraCore	
9/27/09	NTC21SB13-SO-0001	09:00	SW-846 8270C/8181/8081A/8082/6010 B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB13	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/27/09	NTC21SB13-SO-0204	09:10	SW-846 8270C/8181/8081A/8082/6010 B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB13	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/27/09	NTC21SB13-SO-0204	09:10	SW-846 8260B	TCL VOCs	NTC21SB13	SO	4° C/HNaO4S/MeO H	4	TerraCore	TerraCore	
9/27/09	NTC21SB14-SO-0001	09:30	SW-846 8260B	TCL VOCs	NTC21SB14	SO	4° C/HNaO4S/MeO H	12	TerraCore	TerraCore	Run MS/MSD
9/27/09	NTC21SB14-SO-0001	09:30	SW-846 8270C/8181/8081A/8082/6010 B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB14	SO	4°C	9	Glass - Clear	4 oz. wide-mouth w/Teflon cap	Run MS/MSD
9/27/09	NTC21SB14-SO-0204	09:40	SW-846 8260B	TCL VOCs	NTC21SB14	SO	4° C/HNaO4S/MeO	4	TerraCore	TerraCore	

							H				
9/27/09	NTC21SB14-SO-0204	09:40	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB14	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/27/09	NTC21SB15-SO-0001	10:00	SW-846 8260B	TCL VOCs	NTC21SB15	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/27/09	NTC21SB15-SO-0001	10:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB15	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/27/09	NTC21SB15-SO-0204	10:10	SW-846 8260B	TCL VOCs	NTC21SB15	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/27/09	NTC21SB15-SO-0204	10:10	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB15	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/27/09	NTC21SB16-SO-0001	17:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB16	SO	4° C/HNaO4S/MeOH	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/27/09	NTC21SB16-SO-0001	17:00	SW-846 8260B	TCL VOCs	NTC21SB16	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/27/09	NTC21SB16-SO-0204	16:50	SW-846 8260B	TCL VOCs	NTC21SB16	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/27/09	NTC21SB16-SO-0204	16:50	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB16	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/27/09	NTC21SB19-SO-0001	17:40	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB19	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

Site 21 - Investigation - GREAT LAKES NTC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
9/27/09	NTC21SB19-SO-0001	17:40	SW-846 8260B	TCL VOCs	NTC21SB19	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/27/09	NTC21SB19-SO-0204	17:50	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB19	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/27/09	NTC21SB19-SO-0204	17:50	SW-846 8260B	TCL VOCs	NTC21SB19	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/27/09	NTC21SB22-SO-0001	12:00	SW-846 8260B	TCL VOCs	NTC21SB22	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/27/09	NTC21SB22-SO-0001	12:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB22	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/27/09	NTC21SB22-SO-0204	12:10	SW-846 8260B	TCL VOCs	NTC21SB22	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/27/09	NTC21SB22-SO-0204	12:10	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB22	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/27/09	TB-092709-01	08:00	SW-846 8260B	TCL VOCs	QC	AQ	4°C/H3PO4	2	Glass - Clear	40ml vials	Trip Blank
9/28/09	FD-092809-01	00:00	SW-846 8260B	TCL VOCs	QC	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/28/09	FD-092809-01	00:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	QC	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
			SW-846	TCL							

9/28/09	NTC21SB01-SO-0102	12:00	8270C/8181/8081A/8082/6010B	SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB01	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/28/09	NTC21SB01-SO-0102	12:00	SW-846 8260B	TCL VOCs	NTC21SB01	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/28/09	NTC21SB02-SO-0001	10:20	SW-846 8260B	TCL VOCs	NTC21SB02	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/28/09	NTC21SB02-SO-0001	10:20	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB02	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/28/09	NTC21SB02-SO-0204	10:30	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB02	SO	4°C	9	Glass - Clear	4 oz. wide-mouth w/Teflon cap	Run MS/MSD
9/28/09	NTC21SB02-SO-0204	10:30	SW-846 8260B	TCL VOCs	NTC21SB02	SO	4° C/HNaO4S/MeOH	12	TerraCore	TerraCore	Run MS/MSD
9/28/09	NTC21SB03-SO-0001	12:20	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB03	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/28/09	NTC21SB03-SO-0001	12:20	SW-846 8260B	TCL VOCs	NTC21SB03	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/28/09	NTC21SB03-SO-0204	12:30	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB03	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/28/09	NTC21SB03-SO-0204	12:30	SW-846 8260B	TCL VOCs	NTC21SB03	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

Site 21 - Investigation - GREAT LAKES NTC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
9/28/09	NTC21SB05-SO-0001	10:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB05	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/28/09	NTC21SB05-SO-0001	10:00	SW-846 8260B	TCL VOCs	NTC21SB05	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/28/09	NTC21SB05-SO-0204	10:10	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB05	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/28/09	NTC21SB05-SO-0204	10:10	SW-846 8260B	TCL VOCs	NTC21SB05	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/28/09	NTC21SB08-SO-0001	11:55	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB08	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/28/09	NTC21SB08-SO-0001	11:55	SW-846 8260B	TCL VOCs	NTC21SB08	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/28/09	NTC21SB08-SO-0204	12:00	SW-846 8260B	TCL VOCs	NTC21SB08	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	
9/28/09	NTC21SB08-SO-0204	12:00	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB08	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/28/09	NTC21SB08-SO-0204	12:00	ASTM D422 (or as instructed by TtNUS)	Grain Size	NTC21SB08	SO	None	1	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
9/28/09	TB-092809-01	08:00	SW-846 8260B	TCL VOCs	QC	AQ	4°C/HCL	2	Glass - Clear	40ml vials	Trip Blank
	RB-092909-										

9/29/09	01	11:26	SW-846 8260B	TCL VOCs	QC	AQ	4°C/HCL	3	Glass - Clear	40ml vials	
9/29/09	RB-092909-01	11:26	SW-846 8270C/8181/8081A/8082	TCL SVOCs/Herb/Pest/PCB	QC	AQ	4°C	6	Glass - Amber	1L	from deconned shoe of DPT rig
9/29/09	RB-092909-01	11:26	SW-846 6010B	TAL Metals (Total)	QC	AQ	4°C/HNO3	1	Plastic - Bell Arte HDPE	250ml	
9/29/09	RB-092909-02	13:02	SW-846 8270C/8181/8081A/8082	TCL SVOCs/Herb/Pest/PCB	QC	AQ	4°C	6	Glass - Amber	1L	DPT disposible sleeve
9/29/09	RB-092909-02	13:02	SW-846 8260B	TCL VOCs	QC	AQ	4°C/HCL	3	Glass - Clear	40ml vials	
9/29/09	RB-092909-02	13:02	SW-846 6010B	TAL Metals (Total)	QC	AQ	4°C/HNO3	1	Plastic - Bell Arte HDPE	250ml	
9/29/09	SB-092909-01	10:31	SW-846 6010B	TAL Metals (Total)	QC	AQ	4°C/HNO3	1	Plastic - Bell Arte HDPE	250ml	
9/29/09	SB-092909-01	10:31	SW-846 8260B	TCL VOCs	QC	AQ	4°C/HCL	3	Glass - Clear	40ml vials	
9/29/09	SB-092909-01	10:31	SW-846 8270C/8181/8081A/8082	TCL SVOCs/Herb/Pest/PCB	QC	AQ	4°C	6	Glass - Amber	1L	
9/29/09	TB-092909-01	10:28	SW-846 8260B	TCL VOCs	QC	AQ	4°C/HCL	2	Glass - Clear	40ml vials	Trip Blank

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General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Project Manager (PM)**	Biff Cummings	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**PM Telephone**		**Created Date**	9/29/09
Task/Contract #	0064	**Field Op Leader (FOL)**	Shannon Hill	**Modified By**	
WBS Code #	0000.0320	**FOL Phone**		**Modified Date**	
Chain of Custody ID	ED00000105-2	**Carrier**	Airborne Express	**Printed By**	Bob Davis
		Carrier/Waybill No.	8698 1038 6240 0215	**Printed Date**	9/30/09

Chain of Custody Information

Chain of Custody #	**ED00000105-2**	**Lab Name**	SGS North American Inc.	**Relenquished By**	Shannon Hill
Carrier	Airborne Express	**Address**	5500 Business Drive	**Date**	09/29/2009
Carrier/Waybill No.	8698 1038 6240 0215	**City, State, Zip**	Wilmington, NC 28405	**Time**	17:54
		Lab Contact	Linda McWhirter	**Received By:**	Airborne Express
		Lab Telephone	910.350.1903	**Date**	9/29/09
				Time	18:54

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
9/26/09	FD-092609-02	00:00	SW-846 8290	Dioxins/Furans	QC	SO	4°C	2	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
9/26/09	NTC21SB09-SO-0001	16:20	SW-846 8290	Dioxins/Furans	NTC21SB09	SO	4°C	2	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
9/26/09	NTC21SB17-SO-0001	13:26	SW-846 8290	Dioxins/Furans	NTC21SB17	SO	4°C	2	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
										4 oz. wide-	

9/27/09	NTC21SB14-SO-0001	09:30	SW-846 8290	Dioxins/Furans	NTC21SB14	SO	4°C	2	Glass - Amber	mouth w/Teflon cap	
9/28/09	NTC21SB02-SO-0204	10:30	SW-846 8290	Dioxins/Furans	NTC21SB02	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	Run MS/MSD
9/29/09	RB-092909-01	11:26	SW-846 8290	Dioxins/Furans	QC	AQ	4°C	2	Glass - Amber	1L	
9/29/09	SB-092909-01	10:31	SW-846 8290	Dioxins/Furans	QC	AQ	4°C	2	Glass - Amber	1L	

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General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

Site 21 - Investigation - GREAT LAKES NTC

CHAIN OF CUSTODY LOG

Project Information

Facility Name	GREAT LAKES NTC	**Project Manager (PM)**	Biff Cummings	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**PM Telephone**		**Created Date**	11/13/09
Task/Contract #	0064	**Field Op Leader (FOL)**	Shannon Hill	**Modified By**	
WBS Code #	0000.0320	**FOL Phone**		**Modified Date**	
Chain of Custody ID	ED00000105-3	**Carrier**	Federal Express	**Printed By**	Bob Davis
		Carrier/Waybill No.	8631 3888 3733 0215	**Printed Date**	1/14/10

Chain of Custody Information

Chain of Custody #	**ED00000105-3**	**Lab Name**	Empirical Laboritories, LLC.	**Relenquished By**	Shannon Hill
Carrier	Federal Express	**Address**	227 French Landing Drive	**Date**	11/13/2009
Carrier/Waybill No.	8631 3888 3733 0215	**City, State, Zip**	Nashville, TN 37228	**Time**	18:11
		Lab Contact	Janice Shilling	**Received By:**	Federal Express
		Lab Telephone	615.345.1115 ext. 256	**Date**	11/13/09
				Time	19:11

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
11/13/09	NTC21SB02-SO-0406	09:12	SW-846 8270C/8181/8081A/8082/6010B	TCL SVOCs/Herb/Pest/PCB/TAL Metals	NTC21SB02	SO	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	
11/13/09	NTC21SB02-SO-0406	09:12	SW-846 8260B	TCL VOCs	NTC21SB02	SO	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Project Manager (PM)**	Biff Cummings	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**PM Telephone**		**Created Date**	11/16/09
Task/Contract #	0064	**Field Op Leader (FOL)**	Shannon Hill	**Modified By**	
WBS Code #	0000.0320	**FOL Phone**		**Modified Date**	
Chain of Custody ID	ED00000105-5	**Carrier**	Federal Express	**Printed By**	Bob Davis
		Carrier/Waybill No.	8631 3888 3722 0215	**Printed Date**	1/14/10

Chain of Custody Information

Chain of Custody #	**ED00000105-5**	**Lab Name**	SGS North American Inc.	**Relenquished By**	Shannon Hill
Carrier	Federal Express	**Address**	5500 Business Drive	**Date**	11/16/2009
Carrier/Waybill No.	8631 3888 3722 0215	**City, State, Zip**	Wilmington, NC 28405	**Time**	17:54
		Lab Contact	Linda McWhirter	**Received By:**	Federal Express
		Lab Telephone	910.350.1903	**Date**	11/16/09
				Time	18:54

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
11/15/09	NTC21MW0501	16:26	SW-846 8290	Dioxins/Furans	NTC21-MW05	GW	4°C	6	Glass - Amber	1L	MS/MSD

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Project Manager (PM)**	Biff Cummings	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**PM Telephone**		**Created Date**	11/16/09
Task/Contract #	0064	**Field Op Leader (FOL)**	Shannon Hill	**Modified By**	
WBS Code #	0000.0320	**FOL Phone**		**Modified Date**	
Chain of Custody ID	ED00000105-4	**Carrier**	Federal Express	**Printed By**	Bob Davis
		Carrier/Waybill No.	8631 3888 3744 0215	**Printed Date**	1/14/10

Chain of Custody Information

Chain of Custody #	**ED00000105-4**	**Lab Name**	Empirical Laboritories, LLC.	**Relenquished By**	Shannon Hill
Carrier	Federal Express	**Address**	227 French Landing Drive	**Date**	11/16/2009
Carrier/Waybill No.	8631 3888 3744 0215	**City, State, Zip**	Nashville, TN 37228	**Time**	17:46
		Lab Contact	Janice Shilling	**Received By:**	Federal Express
		Lab Telephone	615.345.1115 ext. 256	**Date**	11/16/09
				Time	18:46

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
11/15/09	NTC21MW0501	16:26	SW-846 8270C/8181/8081A/8082	TCL SVOCs/Herb/Pest/PCB	NTC21-MW05	GW	4°C	18	Glass - Amber	1L	MS/MSD
11/15/09	NTC21MW0501	16:26	SW-846 6010B	TAL Metals (Total)	NTC21-MW05	GW	4°C/HNO3	3	Plastic - PE	250ml	MS/MSD
11/15/09	NTC21MW0501	16:26	SW-846 8260B	TCL VOCs	NTC21-MW05	GW	4°C/HCL	9	Glass - Clear	40ml vials	MS/MSD
11/16/09	NTC21-[illegible]11609-01	00:00	SW-846 8270C/8181/8081A/8082	TCL SVOCs/Herb/Pest/PCB	QC	GW	4°C	6	Glass - Amber	1L	

11/16/09	NTC21-FD111609-01	00:00	SW-846 6010B	TAL Metals (Total)	QC	GW	4°C/HNO3	1	Plastic - PE	250ml	
11/16/09	NTC21-FD111609-01	00:00	SW-846 8260B	TCL VOCs	QC	GW	4°C/HCL	3	Glass - Clear	40ml vials	
11/16/09	NTC21MW0201	12:46	SW-846 8260B	TCL VOCs	NTC21-MW02	GW	4°C/HCL	3	Glass - Clear	40ml vials	
11/16/09	NTC21MW0201	12:46	SW-846 8270C/8181/8081A/8082	TCL SVOCs/Herb/Pest/PCB	NTC21-MW02	GW	4°C	6	Glass - Amber	1L	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

Site 21 - Investigation - GREAT LAKES NTC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
11/16/09	NTC21MW0201	12:46	SW-846 6010B	TAL Metals (Total)	NTC21-MW02	GW	4°C/HNO3	1	Plastic - PE	250ml	
11/16/09	NTC21MW0301	10:05	SW-846 6010B	TAL Metals (Total)	NTC21-MW03	GW	4°C/HNO3	1	Plastic - PE	250ml	
11/16/09	NTC21MW0301	10:05	SW-846 8260B	TCL VOCs	NTC21-MW03	GW	4°C/HCL	3	Glass - Clear	40ml vials	
11/16/09	NTC21MW0301	10:05	SW-846 8270C/8181/8081A/8082	TCL SVOCs/Herb/Pest/PCB	NTC21-MW03	GW	4°C	6	Glass - Amber	1L	
11/16/09	NTC21MW0401	13:10	SW-846 6010B - Filtered	TAL Metals (Dissolved)	NTC21-MW04	GW	4°C/HNO3	1	Plastic - PE	250ml	
11/16/09	NTC21MW0401	13:10	SW-846 8270C/8181/8081A/8082	TCL SVOCs/Herb/Pest/PCB	NTC21-MW04	GW	4°C	6	Glass - Amber	1L	
11/16/09	NTC21MW0401	13:10	SW-846 6010B	TAL Metals (Total)	NTC21-MW04	GW	4°C/HNO3	1	Plastic - PE	250ml	
11/16/09	NTC21MW0401	13:10	SW-846 8260B	TCL VOCs	NTC21-MW04	GW	4°C/HCL	3	Glass - Clear	40ml vials	

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

Site 21 - Investigation - GREAT LAKES NTC

Project Information

Facility Name	GREAT LAKES NTC	**Project Manager (PM)**	Biff Cummings	**Created By**	Shannon Hill
TtNUS Project #	112G01797	**PM Telephone**		**Created Date**	11/17/09
Task/Contract #	0064	**Field Op Leader (FOL)**	Shannon Hill	**Modified By**	
WBS Code #	0000.0320	**FOL Phone**		**Modified Date**	
Chain of Custody ID	ED00000105-6	**Carrier**	Federal Express	**Printed By**	Bob Davis
		Carrier/Waybill No.	8631 2526 7844 0215	**Printed Date**	1/14/10

Chain of Custody Information

Chain of Custody #	**ED00000105-6**	**Lab Name**	Empirical Laboritories, LLC.	**Relenquished By**	Shannon Hill
Carrier	Federal Express	**Address**	227 French Landing Drive	**Date**	11/17/2009
Carrier/Waybill No.	8631 2526 7844 0215	**City, State, Zip**	Nashville, TN 37228	**Time**	18:50
		Lab Contact	Janice Shilling	**Received By:**	Federal Express
		Lab Telephone	615.345.1115 ext. 256	**Date**	11/17/09
				Time	19:50

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
11/17/09	NTC21MW0101	11:45	SW-846 6010B	TAL Metals (Total)	NTC21-MW01	GW	4°C/HNO3	1	Plastic - PE	250ml	
11/17/09	NTC21MW0101	11:45	SW-846 8260B	TCL VOCs	NTC21-MW01	GW	4°C/HCL	3	Glass - Clear	40ml vials	
11/17/09	NTC21MW0101	11:45	SW-846 8270C/8181/8081A/8082	TCL SVOCs/Herb/Pest/PCB	NTC21-MW01	GW	4°C	6	Glass - Amber	1L	
11/17/09	NTC21MW0601	14:05	SW-846 8260B	TCL VOCs	NTC21-MW06	GW	4°C/HCL	3	Glass - Clear	40ml vials	
			SW-846	TCL							

11/17/09	NTC21MW0601	14:05	8270C/8181/8081A/8082	SVOCs/Herb/Pest/PCB	NTC21-MW06	GW	4°C	6	Glass - Amber	1L	
11/17/09	NTC21MW0601	14:05	SW-846 6010B	TAL Metals (Total)	NTC21-MW06	GW	4°C/HNO3	1	Plastic - PE	250ml	
11/17/09	TB-111709-01	08:00	SW-846 8260B	TCL VOCs	QC	AQ	4°C/HCL	2	Glass - Clear	40ml vials	

G330-42

Project No: 112G01797	Facility: GREAT LAKES NTC	Project Manager: Biff Cummings	Carrier: Airborne Express	Laboratory Name: SGS North American Inc. 5500 Business Drive Wilmington, NC 28405
Task No: 0064	Turn Around Time: Standard	Field Ops Leader: Shannon Hill	Carrier/Waybill No. 8698 1038 6240 0215	Point of Contact: Linda McWhirter 910.350.1903

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
09/26/2009	FD-092609-02	00:00	SW-846 8290	QC	SO	Dioxins/Furans	4°C	2	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
09/26/2009	NTC21SB09-SO-0001	16:20	SW-846 8290	NTC21SB09	SO	Dioxins/Furans	4°C	2	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
09/26/2009	NTC21SB17-SO-0001	13:26	SW-846 8290	NTC21SB17	SO	Dioxins/Furans	4°C	2	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
09/27/2009	NTC21SB14-SO-0001	09:30	SW-846 8290	NTC21SB14	SO	Dioxins/Furans	4°C	2	Glass - Amber	4 oz. wide-mouth w/Teflon cap	
09/28/2009	NTC21SB02-SO-0204	10:30	SW-846 8290	NTC21SB02	SO	Dioxins/Furans	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	MS/MSD
09/29/2009	RB-092909-01	11:26	SW-846 8290	QC	AQ	Dioxins/Furans	4°C	2	Glass - Amber	1L	
09/29/2009	SB-092909-01	10:31	SW-846 8290	QC	AQ	Dioxins/Furans	4°C	2	Glass - Amber	1L	

1. Relinquished By: Shannon Hill	Date: 09/29/2009	Time: 17:54	Received By: Airborne Express	Date: 09/29/2009	Time: 18:54
2. Relinquished By:	Date:	Time:	Received By:	Date: 9/30/09	Time: 9:45
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:

Comments: 5.3 Seal intact

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Project No: 112G01797	Facility: GREAT LAKES NTC	Project Manager: **Biff Cummings**	Carrier: **Airborne Express**	Laboratory Name: **Empirical Laboritories, LLC.** **227 French Landing Drive** **Nashville, TN 37228**
Task No: 0064	Turn Around Time: **Standard**	Field Ops Leader: **Shannon Hill**	Carrier/Waybill No. **8631 2526 8200**	Point of Contact: **Janice Shilling** **615.345.1115 ext. 256**

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
											0910006
09/26/2009	FD-092609-01	00:00	**SW-846 8270C/8181/8081A/8082/6010B**	QC	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-01
09/26/2009	FD-092609-01	00:00	**SW-846 8260B**	QC	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	terra core
09/26/2009	FD-092609-02	00:00	**SW-846 8270C/8181/8081A/8082/6010B**	QC	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-02
09/26/2009	FD-092609-02	00:00	**SW-846 8260B**	QC	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	
09/26/2009	NTC21SB09-SO-0001	16:20	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB09	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-03
09/26/2009	NTC21SB09-SO-0001	16:20	**SW-846 8260B**	NTC21SB09	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	
09/26/2009	NTC21SB09-SO-0204	16:28	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB09	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-04
09/26/2009	NTC21SB09-SO-0204	16:28	**SW-846 8260B**	NTC21SB09	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	
09/26/2009	NTC21SB10-SO-0001	18:36	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB10	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-05
09/26/2009	NTC21SB10-SO-0001	18:36	**SW-846 8260B**	NTC21SB10	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	
09/26/2009	NTC21SB10-SO-0406	18:40	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB10	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-06
09/26/2009	NTC21SB10-SO-0406	18:40	**SW-846 8260B**	NTC21SB10	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	
09/26/2009	NTC21SB11-SO-0001	18:10	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB11	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-07
09/26/2009	NTC21SB11-SO-0001	18:10	**SW-846 8260B**	NTC21SB11	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	
09/26/2009	NTC21SB11-SO-0204	18:12	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB11	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-08
09/26/2009	NTC21SB11-SO-0204	18:12	**SW-846 8260B**	NTC21SB11	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core
09/26/2009	NTC21SB12-SO-0001	14:00	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB12	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-09

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09/26/2009	NTC21SB12-SO-0001	14:00	SW-846 8260B	NTC21SB12	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	-09
09/26/2009	NTC21SB12-SO-0204	14:10	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB12	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-10
09/26/2009	NTC21SB12-SO-0204	14:10	**SW-846 8260B**	NTC21SB12	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/26/2009	NTC21SB17-SO-0001	13:26	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB17	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4° C/HNaO4S/MeOH	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-11
09/26/2009	NTC21SB17-SO-0001	13:26	**SW-846 8260B**	NTC21SB17	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/26/2009	NTC21SB17-SO-0507	13:32	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB17	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-12
09/26/2009	NTC21SB17-SO-0507	13:32	**SW-846 8260B**	NTC21SB17	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/26/2009	NTC21SB18-SO-0001	12:47	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB18	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-13
09/26/2009	NTC21SB18-SO-0001	12:47	**SW-846 8260B**	NTC21SB18	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/26/2009	NTC21SB18-SO-0507	12:59	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB18	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-14
09/26/2009	NTC21SB18-SO-0507	12:59	**SW-846 8260B**	NTC21SB18	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	terra core	↓
09/26/2009	NTC21SB20-SO-0001	16:57	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB20	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-15
09/26/2009	NTC21SB20-SO-0001	16:57	**SW-846 8260B**	NTC21SB20	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/26/2009	NTC21SB20-SO-0406	17:02	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB20	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-16
09/26/2009	NTC21SB20-SO-0406	17:02	**SW-846 8260B**	NTC21SB20	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/26/2009	NTC21SB21-SO-0001	15:10	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB21	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-17
09/26/2009	NTC21SB21-SO-0001	15:10	**SW-846 8260B**	NTC21SB21	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/26/2009	NTC21SB21-SO-0608	15:20	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB21	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-18
09/26/2009	NTC21SB21-SO-0608	15:20	**SW-846 8260B**	NTC21SB21	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/26/2009	TB-092609-01	08:00	**NONE**	QC	AQ		4°C/HCL	2	Glass - Clear	40ml vials	TCL VOC	-19
09/27/2009	FD-092709-01	00:00	**SW-846 8270C/8181/8081A/8082/6010B**	QC	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-20
09/27/2009	FD-092709-01	00:00	**SW-846 8260B**	QC	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/27/2009	NTC21SB04-SO-0001	12:50	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB04	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-21
09/27/2009	NTC21SB04-SO-0001	12:50	**SW-846 8260B**	NTC21SB04	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/27/2009	NTC21SB04-SO-0406	13:00	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB04	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-22
09/27/2009	NTC21SB04-SO-0406	13:00	**SW-846 8260B**	NTC21SB04	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/27/2009	NTC21SB06-SO-0001	15:10	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB06	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-23
09/27/2009	NTC21SB06-SO-0001	15:10	**SW-846 8260B**	NTC21SB06	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/27/2009	NTC21SB06-SO-0204	15:20	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB06	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-24
09/27/2009	NTC21SB06-SO-0204	15:20	**SW-846 8260B**	NTC21SB06	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓

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	0001		8270C/8181/8081A/8082/6010B			Metals				w/Teflon cap		0910006-25
09/27/2009	NTC21SB07-SO-0001	10:40	SW-846 8260B	NTC21SB07	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		
09/27/2009	NTC21SB07-SO-0204	10:50	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB07	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-26
09/27/2009	NTC21SB07-SO-0204	10:50	SW-846 8260B	NTC21SB07	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		
09/27/2009	NTC21SB13-SO-0001	09:00	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB13	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-27
09/27/2009	NTC21SB13-SO-0001	09:00	SW-846 8260B	NTC21SB13	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		
09/27/2009	NTC21SB13-SO-0204	09:10	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB13	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-28
09/27/2009	NTC21SB13-SO-0204	09:10	SW-846 8260B	NTC21SB13	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		
09/27/2009	NTC21SB14-SO-0001	09:30	SW-846 8260B	NTC21SB14	SO	TCL VOCs	4° C/HNaO4S/MeOH	12	Other	Other		-29
09/27/2009	NTC21SB14-SO-0001	09:30	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB14	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	9	Glass - Clear	4 oz. wide-mouth w/Teflon cap		
09/27/2009	NTC21SB14-SO-0204	09:40	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB14	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-30
09/27/2009	NTC21SB14-SO-0204	09:40	SW-846 8260B	NTC21SB14	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		
09/27/2009	NTC21SB15-SO-0001	10:00	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB15	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-31
09/27/2009	NTC21SB15-SO-0001	10:00	SW-846 8260B	NTC21SB15	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	
09/27/2009	NTC21SB15-SO-0204	10:10	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB15	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-32
09/27/2009	NTC21SB15-SO-0204	10:10	SW-846 8260B	NTC21SB15	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	
09/27/2009	NTC21SB16-SO-0001	17:00	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB16	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4° C/HNaO4S/MeOH	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-33
09/27/2009	NTC21SB16-SO-0001	17:00	SW-846 8260B	NTC21SB16	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		
09/27/2009	NTC21SB16-SO-0204	16:50	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB16	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-34
09/27/2009	NTC21SB16-SO-0204	16:50	SW-846 8260B	NTC21SB16	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		
09/27/2009	NTC21SB19-SO-0001	17:40	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB19	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-35
09/27/2009	NTC21SB19-SO-0001	17:40	SW-846 8260B	NTC21SB19	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	
09/27/2009	NTC21SB19-SO-0204	17:50	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB19	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-36
09/27/2009	NTC21SB19-SO-0204	17:50	SW-846 8260B	NTC21SB19	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		
09/27/2009	NTC21SB22-SO-0001	12:00	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB22	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-37
09/27/2009	NTC21SB22-SO-0001	12:00	SW-846 8260B	NTC21SB22	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	terra core	
09/27/2009	NTC21SB22-SO-0204	12:10	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB22	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-38
09/27/2009	NTC21SB22-SO-0204	12:10	SW-846 8260B	NTC21SB22	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		
09/27/2009	TB-092709-01	08:00	SW-846 8260B	QC	AQ	TCL VOCs	4°C/H3PO4	2	Glass - Clear	40ml vials		-39 vos
09/28/2009	FD-092809-01	00:00	SW-846 8270C/8181/8081A/8082/6010B	QC	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-40

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							C/HNaO4S/MeOH					-40
09/28/2009	NTC21SB01-SO-0102	12:00	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB01	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-41
09/28/2009	NTC21SB01-SO-0102	12:00	**SW-846 8260B**	NTC21SB01	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/28/2009	NTC21SB02-SO-0001	10:20	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB02	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-42
09/28/2009	NTC21SB02-SO-0001	10:20	**SW-846 8260B**	NTC21SB02	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/28/2009	NTC21SB02-SO-0204	10:30	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB02	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	9	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-43
09/28/2009	NTC21SB02-SO-0204	10:30	**SW-846 8260B**	NTC21SB02	SO	TCL VOCs	4° C/HNaO4S/MeOH	12	Other	Other	terra core	↓
09/28/2009	NTC21SB03-SO-0001	12:20	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB03	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-44
09/28/2009	NTC21SB03-SO-0001	12:20	**SW-846 8260B**	NTC21SB03	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/28/2009	NTC21SB03-SO-0204	12:30	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB03	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-45
09/28/2009	NTC21SB03-SO-0204	12:30	**SW-846 8260B**	NTC21SB03	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/28/2009	NTC21SB05-SO-0001	10:00	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB05	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-46
09/28/2009	NTC21SB05-SO-0001	10:00	**SW-846 8260B**	NTC21SB05	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/28/2009	NTC21SB05-SO-0204	10:10	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB05	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-47
09/28/2009	NTC21SB05-SO-0204	10:10	**SW-846 8260B**	NTC21SB05	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/28/2009	NTC21SB08-SO-0001	11:55	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB08	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-48
09/28/2009	NTC21SB08-SO-0001	11:55	**SW-846 8260B**	NTC21SB08	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/28/2009	NTC21SB08-SO-0204	12:00	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB08	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-49
09/28/2009	NTC21SB08-SO-0204	12:00	**SW-846 8260B**	NTC21SB08	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/28/2009	NTC21SB08-SO-0204	12:00	**ASTM D422 (or as instructed by TtNUS)**	NTC21SB08	SO	Grain Size	None	1	Glass - Clear	4 oz. wide-mouth w/Teflon cap		↓
09/28/2009	TB-092809-01	08:00	**SW-846 8260B**	QC	AQ	TCL VOCs	4°C/HCL	2	Glass - Clear	40ml vials		-50
09/29/2009	RB-092909-01	11:26	**SW-846 8270C/8181/8081A/8082**	QC	AQ	TCL SVOCs/Herb/Pest/PCB	4°C	6	Glass - Amber	1L	from deconned shoe of DPT rig	-51
09/29/2009	RB-092909-01	11:26	**SW-846 8260B**	QC	AQ	TCL VOCs	4°C/HCL	3	Glass - Clear	40ml vials		
09/29/2009	RB-092909-01	11:26	**SW-846 6010B**	QC	AQ	TAL Metals (Total)	4°C/HNO3	1	Plastic - Bell Arte HDPE	250ml		↓
09/29/2009	RB-092909-02	13:02	**SW-846 8260B**	QC	AQ	TCL VOCs	4°C/HCL	3	Glass - Clear	40ml vials		-52
09/29/2009	RB-092909-02	13:02	**SW-846 8270C/8181/8081A/8082**	QC	AQ	TCL SVOCs/Herb/Pest/PCB	4°C	6	Glass - Amber	1L	DPT disposible sleeve	
09/29/2009	RB-092909-02	13:02	**SW-846 6010B**	QC	AQ	TAL Metals (Total)	4°C/HNO3	1	Plastic - Bell Arte HDPE	250ml		↓
09/29/2009	SB-092909-01	10:31	**SW-846 8260B**	QC	AQ	TCL VOCs	4°C/HCL	3	Glass - Clear	40ml vials		-53
09/29/2009	SB-092909-01	10:31	**SW-846 6010B**	QC	AQ	TAL Metals (Total)	4°C/HNO3	1	Plastic - Bell Arte HDPE	250ml		
09/29/2009	SB-092909-01	10:31	**SW-846 8270C/8181/8081A/8082**	QC	AQ	TCL SVOCs/Herb/Pest/PCB	4°C	6	Glass - Amber	1L		↓
09/29/2009	TB-092909-01	10:28	**SW-846 8260B**	QC	AQ	TCL VOCs	4°C/HCL	2	Glass - Clear	40ml vials		-54

CTO064_001 Volatiles

1. Relinquished By: **Shannon Hill**	Date: 09/29/2009	Time: 13:11	Received By: **Airborne Express**	Date: 09/29/2009	Time: 14:11
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By:	Date: 9/30/09	Time: 08:20

Comments:

3.3°C

CTO064_0001 Summ Package

Project No: 12G01797	Facility: GREAT LAKES NTC	Project Manager: Biff Cummings	Carrier: Airborne Express	Laboratory Name: Empirical Laboritories, LLC. 227 French Landing Drive Nashville, TN 37228
Task No: 064	Turn Around Time: Standard	Field Ops Leader: Shannon Hill	Carrier/Waybill No. 8631 2526 8200	Point of Contact: Janice Shilling 615.345.1115 ext. 256

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
											0910006
09/26/2009	FD-092609-01	00:00	**SW-846 8270C/8181/8081A/8082/6010B**	QC	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-01
09/26/2009	FD-092609-01	00:00	**SW-846 8260B**	QC	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core
09/26/2009	FD-092609-02	00:00	**SW-846 8270C/8181/8081A/8082/6010B**	QC	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-02
09/26/2009	FD-092609-02	00:00	**SW-846 8260B**	QC	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	
09/26/2009	NTC21SB09-SO-0001	16:20	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB09	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-03
09/26/2009	NTC21SB09-SO-0001	16:20	**SW-846 8260B**	NTC21SB09	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	
09/26/2009	NTC21SB09-SO-0204	16:28	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB09	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-04
09/26/2009	NTC21SB09-SO-0204	16:28	**SW-846 8260B**	NTC21SB09	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	
09/26/2009	NTC21SB10-SO-0001	18:36	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB10	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-05
09/26/2009	NTC21SB10-SO-0001	18:36	**SW-846 8260B**	NTC21SB10	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	
09/26/2009	NTC21SB10-SO-0406	18:40	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB10	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-06
09/26/2009	NTC21SB10-SO-0406	18:40	**SW-846 8260B**	NTC21SB10	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	
09/26/2009	NTC21SB11-SO-0001	18:10	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB11	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-07
09/26/2009	NTC21SB11-SO-0001	18:10	**SW-846 8260B**	NTC21SB11	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	
09/26/2009	NTC21SB11-SO-0204	18:12	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB11	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-08
09/26/2009	NTC21SB11-SO-0204	18:12	**SW-846 8260B**	NTC21SB11	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core
09/26/2009	NTC21SB12-SO-0001	14:00	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB12	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-09

09/26/2009	NTC21SB12-SO-0001	14:00	**SW-846 8260B**	NTC21SB12	SO	TCL VOCs	4°C/HNaO4S/MeOH	4	Other	Other	Terra core	-09
09/26/2009	NTC21SB12-SO-0204	14:10	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB12	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-10
09/26/2009	NTC21SB12-SO-0204	14:10	**SW-846 8260B**	NTC21SB12	SO	TCL VOCs	4°C/HNaO4S/MeOH	4	Other	Other		↓
09/26/2009	NTC21SB17-SO-0001	13:26	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB17	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C/HNaO4S/MeOH	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-11
09/26/2009	NTC21SB17-SO-0001	13:26	**SW-846 8260B**	NTC21SB17	SO	TCL VOCs	4°C/HNaO4S/MeOH	4	Other	Other		↓
09/26/2009	NTC21SB17-SO-0507	13:32	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB17	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-12
09/26/2009	NTC21SB17-SO-0507	13:32	**SW-846 8260B**	NTC21SB17	SO	TCL VOCs	4°C/HNaO4S/MeOH	4	Other	Other		↓
09/26/2009	NTC21SB18-SO-0001	12:47	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB18	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-13
09/26/2009	NTC21SB18-SO-0001	12:47	**SW-846 8260B**	NTC21SB18	SO	TCL VOCs	4°C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/26/2009	NTC21SB18-SO-0507	12:59	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB18	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-14
09/26/2009	NTC21SB18-SO-0507	12:59	**SW-846 8260B**	NTC21SB18	SO	TCL VOCs	4°C/HNaO4S/MeOH	4	Other	Other	terra core	↓
09/26/2009	NTC21SB20-SO-0001	16:57	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB20	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-15
09/26/2009	NTC21SB20-SO-0001	16:57	**SW-846 8260B**	NTC21SB20	SO	TCL VOCs	4°C/HNaO4S/MeOH	4	Other	Other		↓
09/26/2009	NTC21SB20-SO-0406	17:02	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB20	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-16
09/26/2009	NTC21SB20-SO-0406	17:02	**SW-846 8260B**	NTC21SB20	SO	TCL VOCs	4°C/HNaO4S/MeOH	4	Other	Other		↓
09/26/2009	NTC21SB21-SO-0001	15:10	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB21	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-17
09/26/2009	NTC21SB21-SO-0001	15:10	**SW-846 8260B**	NTC21SB21	SO	TCL VOCs	4°C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/26/2009	NTC21SB21-SO-0608	15:20	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB21	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-18
09/26/2009	NTC21SB21-SO-0608	15:20	**SW-846 8260B**	NTC21SB21	SO	TCL VOCs	4°C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/26/2009	TB-092609-01	08:00	**NONE**	QC	AQ		4°C/HCL	2	Glass - Clear	40ml vials	TCL VOC	-19
09/27/2009	FD-092709-01	00:00	**SW-846 8270C/8181/8081A/8082/6010B**	QC	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-20
09/27/2009	FD-092709-01	00:00	**SW-846 8260B**	QC	SO	TCL VOCs	4°C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/27/2009	NTC21SB04-SO-0001	12:50	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB04	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-21
09/27/2009	NTC21SB04-SO-0001	12:50	**SW-846 8260B**	NTC21SB04	SO	TCL VOCs	4°C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/27/2009	NTC21SB04-SO-0406	13:00	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB04	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-22
09/27/2009	NTC21SB04-SO-0406	13:00	**SW-846 8260B**	NTC21SB04	SO	TCL VOCs	4°C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/27/2009	NTC21SB06-SO-0001	15:10	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB06	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-23
09/27/2009	NTC21SB06-SO-0001	15:10	**SW-846 8260B**	NTC21SB06	SO	TCL VOCs	4°C/HNaO4S/MeOH	4	Other	Other		↓
09/27/2009	NTC21SB06-SO-0204	15:20	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB06	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-24
09/27/2009	NTC21SB06-SO-0204	15:20	**SW-846 8260B**	NTC21SB06	SO	TCL VOCs	4°C/HNaO4S/MeOH	4	Other	Other		

CTO064 001 Summ Package

	0001		8270C/8181/8081A/8082/6010B			Metals				w/Teflon cap		0910046-25
09/27/2009	NTC21SB07-SO-0001	10:40	**SW-846 8260B**	NTC21SB07	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/27/2009	NTC21SB07-SO-0204	10:50	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB07	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-26
09/27/2009	NTC21SB07-SO-0204	10:50	**SW-846 8260B**	NTC21SB07	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/27/2009	NTC21SB13-SO-0001	09:00	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB13	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-27
09/27/2009	NTC21SB13-SO-0001	09:00	**SW-846 8260B**	NTC21SB13	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/27/2009	NTC21SB13-SO-0204	09:10	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB13	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-28
09/27/2009	NTC21SB13-SO-0204	09:10	**SW-846 8260B**	NTC21SB13	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/27/2009	NTC21SB14-SO-0001	09:30	**SW-846 8260B**	NTC21SB14	SO	TCL VOCs	4° C/HNaO4S/MeOH	12	Other	Other		-29
09/27/2009	NTC21SB14-SO-0001	09:30	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB14	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	9	Glass - Clear	4 oz. wide-mouth w/Teflon cap		↓
09/27/2009	NTC21SB14-SO-0204	09:40	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB14	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-30
09/27/2009	NTC21SB14-SO-0204	09:40	**SW-846 8260B**	NTC21SB14	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/27/2009	NTC21SB15-SO-0001	10:00	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB15	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-31
09/27/2009	NTC21SB15-SO-0001	10:00	**SW-846 8260B**	NTC21SB15	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/27/2009	NTC21SB15-SO-0204	10:10	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB15	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-32
09/27/2009	NTC21SB15-SO-0204	10:10	**SW-846 8260B**	NTC21SB15	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/27/2009	NTC21SB16-SO-0001	17:00	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB16	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4° C/HNaO4S/MeOH	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-33
09/27/2009	NTC21SB16-SO-0001	17:00	**SW-846 8260B**	NTC21SB16	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/27/2009	NTC21SB16-SO-0204	16:50	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB16	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-34
09/27/2009	NTC21SB16-SO-0204	16:50	**SW-846 8260B**	NTC21SB16	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/27/2009	NTC21SB19-SO-0001	17:40	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB19	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-35
09/27/2009	NTC21SB19-SO-0001	17:40	**SW-846 8260B**	NTC21SB19	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/27/2009	NTC21SB19-SO-0204	17:50	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB19	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-36
09/27/2009	NTC21SB19-SO-0204	17:50	**SW-846 8260B**	NTC21SB19	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/27/2009	NTC21SB22-SO-0001	12:00	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB22	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-37
09/27/2009	NTC21SB22-SO-0001	12:00	**SW-846 8260B**	NTC21SB22	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	↓
09/27/2009	NTC21SB22-SO-0204	12:10	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB22	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-38
09/27/2009	NTC21SB22-SO-0204	12:10	**SW-846 8260B**	NTC21SB22	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		↓
09/27/2009	TB-092709-01	08:00	**SW-846 8260B**	QC	AQ	TCL VOCs	4°C/H3PO4	2	Glass - Clear	40ml vials		-39 ws
09/28/2009	FD-092809-01	00:00	**SW-846 8270C/8181/8081A/8082/6010B**	QC	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-40 ↓

							C/HNaO4S/MeOH					-40
09/28/2009	NTC21SB01-SO-0102	12:00	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB01	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-41
09/28/2009	NTC21SB01-SO-0102	12:00	SW-846 8260B	NTC21SB01	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	
09/28/2009	NTC21SB02-SO-0001	10:20	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB02	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-42
09/28/2009	NTC21SB02-SO-0001	10:20	SW-846 8260B	NTC21SB02	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		
09/28/2009	NTC21SB02-SO-0204	10:30	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB02	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	9	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-43
09/28/2009	NTC21SB02-SO-0204	10:30	SW-846 8260B	NTC21SB02	SO	TCL VOCs	4° C/HNaO4S/MeOH	12	Other	Other	terra core	
09/28/2009	NTC21SB03-SO-0001	12:20	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB03	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-44
09/28/2009	NTC21SB03-SO-0001	12:20	SW-846 8260B	NTC21SB03	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	
09/28/2009	NTC21SB03-SO-0204	12:30	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB03	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-45
09/28/2009	NTC21SB03-SO-0204	12:30	SW-846 8260B	NTC21SB03	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		
09/28/2009	NTC21SB05-SO-0001	10:00	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB05	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-46
09/28/2009	NTC21SB05-SO-0001	10:00	SW-846 8260B	NTC21SB05	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		
09/28/2009	NTC21SB05-SO-0204	10:10	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB05	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-47
09/28/2009	NTC21SB05-SO-0204	10:10	SW-846 8260B	NTC21SB05	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		
09/28/2009	NTC21SB08-SO-0001	11:55	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB08	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-48
09/28/2009	NTC21SB08-SO-0001	11:55	SW-846 8260B	NTC21SB08	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other		
09/28/2009	NTC21SB08-SO-0204	12:00	SW-846 8270C/8181/8081A/8082/6010B	NTC21SB08	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap		-49
09/28/2009	NTC21SB08-SO-0204	12:00	SW-846 8260B	NTC21SB08	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	Other	Other	Terra core	
09/28/2009	NTC21SB08-SO-0204	12:00	ASTM D422 (or as instructed by TtNUS)	NTC21SB08	SO	Grain Size	None	1	Glass - Clear	4 oz. wide-mouth w/Teflon cap		
09/28/2009	TB-092809-01	08:00	SW-846 8260B	QC	AQ	TCL VOCs	4°C/HCL	2	Glass - Clear	40ml vials		-50
09/29/2009	RB-092909-01	11:26	SW-846 8270C/8181/8081A/8082	QC	AQ	TCL SVOCs/Herb/Pest/PCB	4°C	6	Glass - Amber	1L	from deconned shoe of DPT rig	-51
09/29/2009	RB-092909-01	11:26	SW-846 8260B	QC	AQ	TCL VOCs	4°C/HCL	3	Glass - Clear	40ml vials		
09/29/2009	RB-092909-01	11:26	SW-846 6010B	QC	AQ	TAL Metals (Total)	4°C/HNO3	1	Plastic - Bell Arte HDPE	250ml		
09/29/2009	RB-092909-02	13:02	SW-846 8260B	QC	AQ	TCL VOCs	4°C/HCL	3	Glass - Clear	40ml vials		-52
09/29/2009	RB-092909-02	13:02	SW-846 8270C/8181/8081A/8082	QC	AQ	TCL SVOCs/Herb/Pest/PCB	4°C	6	Glass - Amber	1L	DPT disposible sleeve	
09/29/2009	RB-092909-02	13:02	SW-846 6010B	QC	AQ	TAL Metals (Total)	4°C/HNO3	1	Plastic - Bell Arte HDPE	250ml		
09/29/2009	SB-092909-01	10:31	SW-846 8260B	QC	AQ	TCL VOCs	4°C/HCL	3	Glass - Clear	40ml vials		-53
09/29/2009	SB-092909-01	10:31	SW-846 6010B	QC	AQ	TAL Metals (Total)	4°C/HNO3	1	Plastic - Bell Arte HDPE	250ml		
09/29/2009	SB-092909-01	10:31	SW-846 8270C/8181/8081A/8082	QC	AQ	TCL SVOCs/Herb/Pest/PCB	4°C	6	Glass - Amber	1L		
09/29/2009	TB-092909-01	10:28	SW-846 8260B	QC	AQ	TCL VOCs	4°C/HCL	2	Glass - Clear	40ml vials		-54

CTO064 001 Summ Package

1. Relinquished By: **Shannon Hill**	Date: 09/29/2009	Time: 13:11	Received By: **Airborne Express**	Date: 09/29/2009	Time: 14:11
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By: [illegible signature]	Date: 9/30/09	Time: 0820

Comments:

3.3°C

CTO064 002 Summ Package

TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: ED00000105-3

Project No: **112G01797**	Facility: **GREAT LAKES NTC**	Project Manager: **Biff Cummings**	Carrier: **Federal Express**	Laboratory Name: **Empirical Laboritories, LLC. 227 French Landing Drive Nashville, TN 37228**
Task No: **0064**	Turn Around Time: **Standard**	Field Ops Leader: **Shannon Hill**	Carrier/Waybill No. **8631 3888 3733 0215**	Point of Contact: **Janice Shilling 615.345.1115 ext. 256**

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
11/13/2009	NTC21SB02-SO-0406	09:12	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB02	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-01
11/13/2009	NTC21SB02-SO-0406	09:12	**SW-846 8260B**	NTC21SB02	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	

0911147

1. Relinquished By: **Shannon Hill**	Date: 11/13/2009	Time: 18:11	Received By: **Federal Express**	Date: 11/13/2009	Time: 19:11
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By:	Date: 11/14/09	Time: 10:45

2.8°C

Comments:

Tt TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: ED00000105-3

Project No: **112G01797**	Facility: **GREAT LAKES NTC**	Project Manager: **Biff Cummings**	Carrier: **Federal Express**	Laboratory Name: **Empirical Laboritories, LLC. 227 French Landing Drive Nashville, TN 37228**
Task No: **0064**	Turn Around Time: **Standard**	Field Ops Leader: **Shannon Hill**	Carrier/Waybill No. **8631 3888 3733 0215**	Point of Contact: **Janice Shilling 615.345.1115 ext. 256**

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
11/13/2009	NTC21SB02-SO-0406	09:12	**SW-846 8270C/8181/8081A/8082/6010B**	NTC21SB02	SO	TCL SVOCs/Herb/Pest/PCB/TAL Metals	4°C	3	Glass - Clear	4 oz. wide-mouth w/Teflon cap	-01
11/13/2009	NTC21SB02-SO-0406	09:12	**SW-846 8260B**	NTC21SB02	SO	TCL VOCs	4° C/HNaO4S/MeOH	4	TerraCore	TerraCore	

0911147

1. Relinquished By: **Shannon Hill**	Date: 11/13/2009	Time: 18:11	Received By: **Federal Express**	Date: 11/13/2009	Time: 19:11
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By:	Date: 11/14/09	Time: 10:45

2.8°C

Comments:

CTO064_0912 Metals

TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: ED00000105-4

Project No: 112G01797	Facility: GREAT LAKES NTC	Project Manager: Biff Cummings	Carrier: Federal Express	Laboratory Name: Empirical Laboritories, LLC. 227 French Landing Drive Nashville, TN 37228
Task No: 0064	Turn Around Time: Standard	Field Ops Leader: Shannon Hill	Carrier/Waybill No. 8631 3888 3744 0215	Point of Contact: Janice Shilling 615.345.1115 ext. 256

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments	
11/15/2009	NTC21MW0501	16:26	SW-846 8270C/8181/8081A/8082	NTC21-MW05	GW	TCL SVOCs/Herb/Pest/PCB	4°C	18	Glass - Amber	1L	MS/MSD	-01
11/15/2009	NTC21MW0501	16:26	SW-846 6010B	NTC21-MW05	GW	TAL Metals (Total)	4°C/HNO3	3	Plastic - PE	250ml	MS/MSD	
11/15/2009	NTC21MW0501	16:26	SW-846 8260B	NTC21-MW05	GW	TCL VOCs	4°C/HCL	9	Glass - Clear	40ml vials	MS/MSD	
11/16/2009	NTC21-FD111609-01	00:00	SW-846 8270C/8181/8081A/8082	QC	GW	TCL SVOCs/Herb/Pest/PCB	4°C	6	Glass - Amber	1L	-02	
11/16/2009	NTC21-FD111609-01	00:00	SW-846 6010B	QC	GW	TAL Metals (Total)	4°C/HNO3	1	Plastic - PE	250ml		
11/16/2009	NTC21-FD111609-01	00:00	SW-846 8260B	QC	GW	TCL VOCs	4°C/HCL	3	Glass - Clear	40ml vials		
11/16/2009	NTC21MW0201	12:46	SW-846 8270C/8181/8081A/8082	NTC21-MW02	GW	TCL SVOCs/Herb/Pest/PCB	4°C	6	Glass - Amber	1L	-03	
11/16/2009	NTC21MW0201	12:46	SW-846 6010B	NTC21-MW02	GW	TAL Metals (Total)	4°C/HNO3	1	Plastic - PE	250ml		
11/16/2009	NTC21MW0201	12:46	SW-846 8260B	NTC21-MW02	GW	TCL VOCs	4°C/HCL	3	Glass - Clear	40ml vials		
11/16/2009	NTC21MW0301	10:05	SW-846 6010B	NTC21-MW03	GW	TAL Metals (Total)	4°C/HNO3	1	Plastic - PE	250ml	-04	
11/16/2009	NTC21MW0301	10:05	SW-846 8260B	NTC21-MW03	GW	TCL VOCs	4°C/HCL	3	Glass - Clear	40ml vials		
11/16/2009	NTC21MW0301	10:05	SW-846 8270C/8181/8081A/8082	NTC21-MW03	GW	TCL SVOCs/Herb/Pest/PCB	4°C	6	Glass - Amber	1L		
11/16/2009	NTC21MW0401	13:10	SW-846 6010B - Filtered	NTC21-MW04	GW	TAL Metals (Dissolved)	4°C/HNO3	1	Plastic - PE	250ml	-06	
11/16/2009	NTC21MW0401	13:10	SW-846 8270C/8181/8081A/8082	NTC21-MW04	GW	TCL SVOCs/Herb/Pest/PCB	4°C	6	Glass - Amber	1L	-05	
11/16/2009	NTC21MW0401	13:10	SW-846 6010B	NTC21-MW04	GW	TAL Metals (Total)	4°C/HNO3	1	Plastic - PE	250ml		
11/16/2009	NTC21MW0401	13:10	SW-846 8260B	NTC21-MW04	GW	TCL VOCs	4°C/HCL	3	Glass - Clear	40ml vials		

0911151

1. Relinquished By: Shannon Hill	Date: 11/16/2009	Time: 17:46	Received By: Federal Express	Date: 11/16/2009	Time: 18:46
2. Relinquished By: Nicole Roehrer	Date: 11/16/2009	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By: [signature]	Date: 11/17/09	Time: 08:30

0.1°C

CTO064_002 Metals

TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: ED00000105-6

Project No: 112G01797	Facility: GREAT LAKES NTC	Project Manager: Biff Cummings	Carrier: Federal Express	Laboratory Name: Empirical Laboritories, LLC. 227 French Landing Drive Nashville, TN 37228
Task No: 0064	Turn Around Time: Standard	Field Ops Leader: Shannon Hill	Carrier/Waybill No. 8631 2526 7844 0215	Point of Contact: Janice Shilling 615.345.1115 ext. 256

0911181

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
11/17/2009	FB-111709-01	08:00	SW-846 8260B	QC	AQ	TCL VOCs	4°C/HCL	2	Glass - Clear	40ml vials	-01
11/17/2009	NTC21MW0101	11:45	SW-846 6010B	NTC21-MW01	GW	TAL Metals (Total)	4°C/HNO3	1	Plastic - PE	250ml	-02
11/17/2009	NTC21MW0101	11:45	SW-846 8260B	NTC21-MW01	GW	TCL VOCs	4°C/HCL	3	Glass - Clear	40ml vials	
11/17/2009	NTC21MW0101	11:45	SW-846 8270C/8181/8081A/8082	NTC21-MW01	GW	TCL SVOCs/Herb/Pest/PCB	4°C	6	Glass - Amber	1L	
11/17/2009	NTC21MW0601	14:05	SW-846 8260B	NTC21-MW06	GW	TCL VOCs	4°C/HCL	3	Glass - Clear	40ml vials	-03
11/17/2009	NTC21MW0601	14:05	SW-846 8270C/8181/8081A/8082	NTC21-MW06	GW	TCL SVOCs/Herb/Pest/PCB	4°C	6	Glass - Amber	1L	
11/17/2009	NTC21MW0601	14:05	SW-846 6010B	NTC21-MW06	GW	TAL Metals (Total)	4°C/HNO3	1	Plastic - PE	250ml	

Relinquished By	Date	Time	Received By	Date	Time
1. Relinquished By: Shannon Hill	11/17/2009	18:50	Federal Express	11/17/2009	19:50
2. Relinquished By:					
3. Relinquished By:			[signature]	11/18/09	08:15

3.8°C

Comments:

17

EMPIRICAL LABORATORIES, LLC - CHAIN OF CUSTODY RECORD

SHIP TO: 621 Mainstream Drive, Suite 270 ♦ Nashville, TN 37228 ♦ 615-345-1115 ♦ (fax) 615-846-5426

8212

Send Results to:

Name Bob Davis
Company THMS
Address 661 Andersen Dr.
City Pgh
State, Zip PA, 15220
Phone 412-921-7090
Fax
E-mail Robert.Davis@Tetratech.com

Send Invoice to:

Name Same
Company
Address
City
State, Zip
Phone
Fax
E-mail

Project No./Name:

Sampler's (Signature):

Analysis Requirements: TAL VOC, SVOC, RCRA 8 metals

Lab Use Only:

	Y	N	NA
VOA Headspace	Y	N	NA
Field Filtered	Y	N	NA
Correct Containers	Y	N	NA
Discrepancies	Y	N	NA
Cust. Seals Intact	Y	N	NA
Containers Intact	Y	N	NA

Airbill #: 8631 2526 9652 0215

CAR #: —

Lab Use Only Lab #	Date/Time Sampled	Sample Description	Sample Matrix	TAL VOC	SVOC	RCRA 8 metals	Comments	No. of Bottles	Lab Use Only Containers/Pres.
0911196-01	11/18/09 0930	NTC01-composite	Sol	4	2	1		8	3S-0, 3M, 1AU
-02	11/18/09 0800	NTC01-TB111809-01	Aq	1				1	1S-HY

Sample Kit Prep'd by: (Signature)	Date/Time	Received By: (Signature)
	11/17/09 1530	
Relinquished by: (Signature)	Date/Time	Received By: (Signature)
	11/19/09 1600	
Relinquished by: (Signature)	Date/Time	Received By: (Signature)
Received for Laboratory by: (Signature)	Date/Time	Temperature
5	11/20/09 08:15	0.4°C

REMARKS:

Details:

Page ______ of ______
Cooler No. ____ of ______
Date Shipped ________
Shipped By ________
Turnaround ________

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

EMPIRICAL LABORATORIES, LLC CHAIN OF CUSTODY RECORD

SHIP TO: 621 Mainstream Drive, Suite 270 ♦ Nashville, TN 37228 ♦ 615-345-1115 ♦ (fax) 615-846-5426

8212

Send Results to:	Send Invoice to:	Lab Use Only:
Name Bob Davis	Name Same	VOA Headspace Y (N) NA
Company TtNUS	Company	Field Filtered Y (N) NA
Address 661 Andersen Dr.	Address	Correct Containers (Y) N NA
City Pgh	City	Discrepancies Y (N) NA
State, Zip PA, 15220	State, Zip	Cust. Seals Intact (Y) N NA
Phone 412-921-7090	Phone	Containers Intact (Y) N NA
Fax	Fax	Airbill #: 8631 2526 9652 0214
E-mail Robert.Davis@Tetratech.com	E-mail	CAR #: —
Project No./Name:	Sampler's (Signature):	

Analysis Requirements: TAL VOC; SVOC; RCRA 8 metals

Lab Use Only Lab #	Date/Time Sampled	Sample Description	Sample Matrix	TAL VOC	SVOC	RCRA 8 metals	Comments	No. of Bottles	Lab Use Only Containers/Pres.
0911196-01	11/18/09 0930	NTC01-Composite	Soil	4	2	1		8	3S-0, 1M 3M
-02	11/18/09 0800	NTC01-TB111809-01	Aq	1				1	1S-H4

Sample Kit Prep'd by: (Signature)	Date/Time 11/19/09 1530	Received By: (Signature)
Relinquished by: (Signature)	Date/Time 11/19/09 1600	Received By: (Signature)
Relinquished by: (Signature)	Date/Time	Received By: (Signature)
Received for Laboratory by: (Signature)	Date/Time 11/20/09 08:15	Temperature 0.4°C

REMARKS:

Details:

Page ______ of ______

Cooler No. ____ of ______

Date Shipped ______

Shipped By ______

Turnaround ______

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

APPENDIX C

WASTE PROFILES

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) — Form Approved. OMB No. 2050-0039

UNIFORM ~~HAZARDOUS~~ WASTE MANIFEST (MH)

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
IL7170024577	1	(847) 688-6934	000288[illegible]

5. Generator's Name and Mailing Address
Naval Station at Great Lakes
201 Decatur Avenue Great Lakes, Illinois 60088
Generator's Site Address (if different than mailing address)
Generator's Phone: 847-688-~~6934~~ [illegible]

6. Transporter 1 Company Name: HazChem Environmental Corporation — U.S. EPA ID Number: ILD984785238

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
Pollution Control Industries
4343 Kennedy Avenue East Chicago, IN 46312
U.S. EPA ID Number: IND000646943
Facility's Phone: (800) 388-7242

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. IDW Waste Not Hazardous Not Regulated by DOT (soil)	18	DM	9000	P	NONE
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
Camp Moffet #-12603
1) 338578

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Mark S Hover — Signature: Mark S. Hov[illegible] — Month 02 Day 04 Year 10

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Bruce Seeman — Signature: [illegible] — Month 02 Day 04 Year 10
Transporter 2 Printed/Typed Name — Signature — Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. ~~Hazardous~~ (MH) Waste Report Management Method Codes (i.e., codes for ~~hazardous~~ (MH) waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of ~~hazardous~~ (MH) materials covered by the manifest except as noted in Item 18a
Printed/Typed Name — Signature — Month Day Year

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete. — GENERATOR'S INITIAL COPY

HAZCHEM ENVIRONMENTAL CORP.
1115 WEST NATIONAL AVE.
ADDISON, IL. 60101-3128
PHONE: 630-458-1910 FAX: 630-458-1918
www.hazchem.com

Sales Order

SHIP DATE	S.O. NO.
2/4/2010	6580

NAME/ADDRESS	SHIP TO
NAVAL STATION AT GREAT LAKES 201 DECATUR AVENUE GREAT LAKES, IL. 60088	NAVAL STATION AT GREAT LAKES CAMP MOFFET 201 DECATUR AVE GREAT LAKES, IL. 60088

INSTRUCTIONS	Rep	P.O. No.	MANIFEST #
P/U ONLY: 18 55GAL DRUMS NON-HAZ SOIL	90	B1120039	002886 18 WAS - PCI

SUPPLIES USED		DISPOSAL OUTLET	PROFILE #	QUANTITY	SIZE	CATEGORY
	5 GAL OTP	PCI	338578	18	55	NH - Soil
	5 GAL STERI					
	15 GAL OTP					
	15 GAL CTP					
	30 GAL OTP					
	30 GAL CTP					
	55 GAL OTP					
	55 GAL CTP					
	15 GAL OTS					
	15 GAL CTS					
	30 GAL OTS					
	30 GAL CTS					
	55 GAL OTS					
	55 GAL CTS					
	55 GAL OTS (U)					
	85 GAL OP	PERSONNEL				
	YD. 3 BOX	NAME:	Brian			
	VERMICULITE	HOURS:	7 30/			

I hereby declare that the quantity and contents of this consignment are fully and accurately described. All items are packaged in accordance with DOT specification and drum integrity according to 49 CFR, Part 173, Subpart E and F. Customer agrees to pay a finance charge of 2% per month on past due balance until paid in full.

Customer Signature [signature] Date 2/4/2010

Generator acknowledges by signature below that the original quotation was exceeded due to additional time and materials

Customer Signature Date

APPENDIX D

DATA VALIDATION REPORTS

APPENDIX E

SURVEY REPORT

The Survey Report will be provided in the final document.

APPENDIX F

ANALYTICAL RESULTS – SITE 21 SI

F-1 SURFACE SOIL ANALYTICAL RESULTS

F-2 SUBSURFACE SOIL ANALYTICAL RESULTS

F-3 GROUNDWATER ANALYTICAL RESULTS

F-4 QA/QC AND IDW ANALYTICAL RESULTS

F-1 SURFACE SOIL ANALYTICAL RESULTS

SUMMARY OF SURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB01-SO-0102	NTC21SB02-SO-0001	NTC21SB03-SO-0001	NTC21SB04-SO-0001	NTC21SB05-SO-0001	NTC21SB06-SO-0001	NTC21SB07-SO-0001
LOCATION ID	NTC21-SB-01	NTC21-SB-02	NTC21-SB-03	NTC21-SB-04	NTC21-SB-05	NTC21-SB-06	NTC21-SB-07
SAMPLE DATE	20090928	20090928	20090928	20090927	20090928	20090927	20090927
SAMPLE TIME	12:00:00	10:20:00	12:20:00	12:50:00	10:00:00	15:10:00	10:40:00
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	1	0	0	0	0	0	0
BOTTODEPTH	2	1	1	1	1	1	1
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SS	SS	SS	SS	SS	SS	SS
Volatile Organics (ug/kg)							
1,1,1-TRICHLOROETHANE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
1,1,2,2-TETRACHLOROETHANE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
1,1,2-TRICHLOROETHANE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
1,1,2-TRICHLOROTRIFLUOROETHANE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
1,1-DICHLOROETHANE	4.3 UJ	4.8 UJ	5.3 UJ	5.2 U	7.1 U	4.3 U	6 UJ
1,1-DICHLOROETHENE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
1,2,4-TRICHLOROBENZENE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
1,2-DIBROMO-3-CHLOROPROPANE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
1,2-DIBROMOETHANE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
1,2-DICHLOROBENZENE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
1,2-DICHLOROETHANE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
1,2-DICHLOROPROPANE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
1,3-DICHLOROBENZENE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
1,4-DICHLOROBENZENE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
2-BUTANONE	4.3 U	4.8 U	5.3 U	5.2 UJ	30 J	4.3 UJ	6 U
2-HEXANONE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
4-METHYL-2-PENTANONE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 UJ	4.3 U	6 U
ACETONE	4.3 U	130	5.3 U	5.2 U	180 J	14 U	6 U
BENZENE	1.1 J	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	0.82 J
BROMODICHLOROMETHANE	8.6 U	9.7 U	10 U	10 U	14 U	8.6 U	12 U
BROMOFORM	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
BROMOMETHANE	8.6 U	9.7 U	10 U	10 U	14 U	8.6 U	12 U
CARBON DISULFIDE	2.8 J	4.1 J	1.6 J	6.7	2.3 J	5	2.4 J
CARBON TETRACHLORIDE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
CHLOROBENZENE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
CHLORODIBROMOMETHANE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
CHLOROETHANE	8.6 U	9.7 U	10 U	10 U	14 U	8.6 U	12 U
CHLOROFORM	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
CHLOROMETHANE	8.6 U	9.7 U	10 U	10 U	14 U	8.6 U	12 U
CIS-1,2-DICHLOROETHENE	8.6 U	9.7 U	10 U	10 U	14 U	8.6 U	12 U
CIS-1,3-DICHLOROPROPENE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
CYCLOHEXANE	1.2 J	4.8 U	0.81 J	0.91 J	1.4 J	4.3 U	1.4 J
DICHLORODIFLUOROMETHANE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
ETHYLBENZENE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
ISOPROPYLBENZENE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
METHYL ACETATE	8.6 U	9.7 U	10 U	10 U	14 U	8.6 U	12 U
METHYL CYCLOHEXANE	2.4 J	0.43 J	1.6 J	2.1 J	2.5 J	4.3 U	3.5 J
METHYL TERT-BUTYL ETHER	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
METHYLENE CHLORIDE	1 U	1.3 U	1.4 U	1.1 U	3.2 U	0.94 U	1.2 U
STYRENE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
TETRACHLOROETHENE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
TOLUENE	1.4 J	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
TOTAL XYLENES	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
TRANS-1,2-DICHLOROETHENE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
TRANS-1,3-DICHLOROPROPENE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
TRICHLOROETHENE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
TRICHLOROFLUOROMETHANE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U
VINYL CHLORIDE	4.3 U	4.8 U	5.3 U	5.2 U	7.1 U	4.3 U	6 U

APPENDIX F-1

SUMMARY OF SURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB01-SO-0102	NTC21SB02-SO-0001	NTC21SB03-SO-0001	NTC21SB04-SO-0001	NTC21SB05-SO-0001	NTC21SB06-SO-0001	NTC21SB07-SO-0001
LOCATION ID	NTC21-SB-01	NTC21-SB-02	NTC21-SB-03	NTC21-SB-04	NTC21-SB-05	NTC21-SB-06	NTC21-SB-07
SAMPLE DATE	20090928	20090928	20090928	20090927	20090928	20090927	20090927
SAMPLE TIME	12:00:00	10:20:00	12:20:00	12:50:00	10:00:00	15:10:00	10:40:00
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	1	0	0	0	0	0	0
BOTTODEPTH	2	1	1	1	1	1	1
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SS	SS	SS	SS	SS	SS	SS
Semivolatile Organics (ug/kg)							
1,1-BIPHENYL	62 J	370 U	350 U	360 U	360 U	400 U	360 U
2,2'-OXYBIS(1-CHLOROPROPANE)	790 U	740 U	700 U	720 U	710 U	810 U	730 U
2,4,5-TRICHLOROPHENOL	400 U	370 U	350 U	360 U	360 U	400 U	360 U
2,4,6-TRICHLOROPHENOL	400 U	370 U	350 U	360 U	360 U	400 U	360 U
2,4-DICHLOROPHENOL	400 U	370 U	350 U	360 U	360 U	400 U	360 U
2,4-DIMETHYLPHENOL	790 U	740 U	700 U	720 U	710 U	810 U	730 U
2,4-DINITROPHENOL	4000 U	3700 U	3500 U	3600 U	3600 U	4000 U	3600 U
2,4-DINITROTOLUENE	400 U	370 U	350 U	360 U	360 U	400 U	360 U
2,6-DINITROTOLUENE	400 U	370 U	350 U	360 U	360 U	400 U	360 U
2-CHLORONAPHTHALENE	400 U	370 U	350 U	360 U	360 U	400 U	360 U
2-CHLOROPHENOL	400 U	370 U	350 U	360 U	360 U	400 U	360 U
2-METHYLNAPHTHALENE	180	450	330	700	400	640	800
2-METHYLPHENOL	400 U	370 U	350 U	360 U	360 U	400 U	360 U
2-NITROANILINE	1600 U	1500 U	1400 U	1400 U	1400 U	1600 U	1400 U
2-NITROPHENOL	400 U	370 U	350 U	360 U	360 U	400 U	360 U
3,3'-DICHLOROBENZIDINE	400 U	370 U	350 U	360 U	360 U	400 U	360 U
3-NITROANILINE	1600 U	1500 U	1400 U	1400 U	1400 U	1600 U	1400 U
4,6-DINITRO-2-METHYLPHENOL	1600 U	1500 U	1400 U	1400 U	1400 U	1600 U	1400 U
4-BROMOPHENYL PHENYL ETHER	400 U	370 U	350 U	360 U	360 U	400 U	360 U
4-CHLORO-3-METHYLPHENOL	400 U	370 U	350 U	360 U	360 U	400 U	360 U
4-CHLOROANILINE	400 U	370 U	350 U	360 U	360 U	400 U	360 U
4-CHLOROPHENYL PHENYL ETHER	400 U	370 U	350 U	360 U	360 U	400 U	360 U
4-METHYLPHENOL	400 U	370 U	350 U	360 U	360 U	400 U	360 U
4-NITROANILINE	1600 U	1500 U	1400 U	1400 U	1400 U	1600 U	1400 U
4-NITROPHENOL	1600 U	1500 UJ	1400 UJ	1400 U	1400 UJ	1600 U	1400 U
ACENAPHTHENE	880	3.7 U	54	87	81	65	840
ACENAPHTHYLENE	20	56	680	3.6 U	3.6 U	4 U	130
ACETOPHENONE	400 U	370 U	350 U	360 U	360 U	400 U	360 U
ANTHRACENE	1700	59	350	3.6 U	180 J	4 U	1700
ATRAZINE	400 U	370 UJ	350 UJ	360 U	360 UJ	400 U	360 U
BENZALDEHYDE	400 UR	370 U	350 U	360 UR	360 U	400 UR	360 UR
BENZO(A)ANTHRACENE	4800	240	1100 J	380	250 J	4 U	4200
BENZO(A)PYRENE	4200	360	2400 J	3.6 U	390 J	4 U	3200
BENZO(B)FLUORANTHENE	6600	540	3500 J	870	480 J	720	4400
BENZO(G,H,I)PERYLENE	2200	340 J	1300 J	290	260 J	4 U	1400
BENZO(K)FLUORANTHENE	2500	120	2000	820	300 J	690	1700
BIS(2-CHLOROETHOXY)METHANE	400 U	370 U	350 U	360 U	360 U	400 U	360 U
BIS(2-CHLOROETHYL)ETHER	400 U	370 U	350 U	360 U	360 U	400 U	360 U
BIS(2-ETHYLHEXYL)PHTHALATE	400 UJ	200 J	240 J	110 J	240 J	150 J	150 J
BUTYL BENZYL PHTHALATE	400 UJ	370 UJ	350 UJ	360 UJ	360 UJ	400 U	360 U
CAPROLACTAM	400 U	370 U	350 U	360 U	360 U	400 U	360 U
CARBAZOLE	1000	740 U	700 U	720 U	710 U	810 U	880
CHRYSENE	5900	270	1300 J	340	280 J	4 U	4600
DI-N-BUTYL PHTHALATE	400 U	370 UJ	350 UJ	360 U	360 UJ	400 U	360 U
DI-N-OCTYL PHTHALATE	400 UJ	370 UJ	350 UJ	360 UJ	360 UJ	400 UJ	360 UJ
DIBENZO(A,H)ANTHRACENE	1100	89 J	900 J	3.6 U	78 J	4 U	3.6 U
DIBENZOFURAN	540	97 J	110 J	250 J	130 J	200 J	620
DIETHYL PHTHALATE	400 U	370 U	350 U	360 U	360 U	400 U	360 U
DIMETHYL PHTHALATE	400 U	370 U	350 U	360 U	360 U	400 U	360 U
FLUORANTHENE	14000	420	3300	1100	790	1000	12000
FLUORENE	960	3.7 U	55	3.6 U	3.6 U	4 U	8[illegible]

SUMMARY OF SURFAC_ _ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB01-SO-0102	NTC21SB02-SO-0001	NTC21SB03-SO-0001	NTC21SB04-SO-0001	NTC21SB05-SO-0001	NTC21SB06-SO-0001	NTC21SB07-SO-0001
LOCATION ID	NTC21-SB-01	NTC21-SB-02	NTC21-SB-03	NTC21-SB-04	NTC21-SB-05	NTC21-SB-06	NTC21-SB-07
SAMPLE DATE	20090928	20090928	20090928	20090927	20090928	20090927	20090927
SAMPLE TIME	12:00:00	10:20:00	12:20:00	12:50:00	10:00:00	15:10:00	10:40:00
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	1	0	0	0	0	0	0
BOTTODEPTH	2	1	1	1	1	1	1
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SS	SS	SS	SS	SS	SS	SS
Semivolatile Organics (ug/kg) (Continued)							
HEXACHLOROBENZENE	400 U	370 U	350 U	360 U	360 U	400 U	360 U
HEXACHLOROBUTADIENE	400 U	370 U	350 U	360 U	360 U	400 U	360 U
HEXACHLOROCYCLOPENTADIENE	400 U	370 U	350 U	360 U	360 U	400 U	360 U
HEXACHLOROETHANE	790 U	740 U	700 U	720 U	710 U	810 U	730 U
INDENO(1,2,3-CD)PYRENE	3300	420 J	3.5 UJ	3.6 U	330 J	4 U	2100
ISOPHORONE	400 U	370 U	350 U	360 U	360 U	400 U	360 U
N-NITROSO-DI-N-PROPYLAMINE	400 U	370 U	350 U	360 U	360 U	400 U	360 U
N-NITROSODIPHENYLAMINE	400 U	370 U	350 U	360 U	360 U	400 U	360 U
NAPHTHALENE	520	210	200	300	140	480	370
NITROBENZENE	400 U	370 U	350 U	360 U	360 U	400 U	360 U
PENTACHLOROPHENOL	1600 U	1500 U	1400 U	1400 U	1400 U	1600 U	1400 U
PHENANTHRENE	9500	620	960	1200	790	810	8400
PHENOL	400 U	370 U	350 U	360 U	360 U	400 U	360 U
PYRENE	11000	420	3000	890	660	870	9400
BAP EQUIVALENT	6800.9	570.47	3781.3	133.54	577.28	78.9	4291.6
BAP EQUIVALENT FULLND	6800.9	570.47	3781.65	141.1	577.28	87.704	4295.2
TOTAL PAHS	69360	4614	21429	6977	5409	5275	56130
TOTAL PAHS FULLND	69360	4621.4	21432.5	6998.6	5416.2	5311	56133.6
Pesticides/PCBS (ug/kg)							
4,4'-DDD	14 J	17 J	20 J	4.7 J	130	290	30
4,4'-DDE	10	5.3	9.4	7.9 J	130	220	16
4,4'-DDT	14 J	20 J	23 J	30 J	160 J	110 J	9.1 J
ALDRIN	0.33 J	0.37 UJ	0.23 J	0.36 UJ	0.35 UJ	0.4 UJ	0.36 UJ
ALPHA-BHC	0.39 U	0.28 J	5.2 J	0.36 U	12 J	0.3 J	0.36 U
ALPHA-CHLORDANE	7.4 J	0.64 J	1.1 J	0.36 UJ	0.35 UJ	5.1 J	1.3 J
AROCLOR-1016	20.2 U	19 U	17.9 U	18.4 U	18.2 U	20.6 U	18.6 U
AROCLOR-1221	20.2 U	19 U	17.9 U	18.4 U	18.2 U	20.6 U	18.6 U
AROCLOR-1232	20.2 U	19 U	17.9 U	18.4 U	18.2 U	20.6 U	18.6 U
AROCLOR-1242	20.2 U	19 U	17.9 U	18.4 U	18.2 U	20.6 U	18.6 U
AROCLOR-1248	20.2 U	19 U	17.9 U	18.4 U	18.2 U	20.6 U	18.6 U
AROCLOR-1254	20.2 U	19 U	17.9 U	18.4 U	18.2 U	20.6 U	18.6 U
AROCLOR-1260	20.2 UJ	190 J	130 J	310 J	210 J	310 J	21 J
BETA-BHC	0.27 J	0.37 U	1 J	0.36 U	0.35 U	0.4 U	0.56 J
DELTA-BHC	0.51 J	0.37 U	0.35 U	0.36 U	0.35 U	1.4	0.36 U
DIELDRIN	0.8 UJ	2 J	1.9 J	13 J	2.8 J	3.5 J	3.7 J
ENDOSULFAN I	0.39 UJ	0.37 UJ	0.2 J	3.2 J	0.35 UJ	2.3 J	0.36 UJ
ENDOSULFAN II	0.8 UJ	1.5 J	1.7 J	0.73 UJ	0.72 UJ	0.81 UJ	0.731 UJ
ENDOSULFAN SULFATE	1.8 J	1.3 J	2.7 J	4.9 J	0.72 UJ	0.81 UJ	0.731 UJ
ENDRIN	0.71 J	0.75 UJ	1.1 J	72	0.72 UJ	6.7 J	0.731 U
ENDRIN ALDEHYDE	0.39 J	0.75 UJ	0.71 UJ	8.6 J	0.72 UJ	0.81 UJ	0.731 UJ
ENDRIN KETONE	0.85 J	0.75 UJ	1.5 J	0.73 UJ	0.72 UJ	0.81 UJ	0.731 UJ
GAMMA-BHC (LINDANE)	0.25 J	0.37 U	0.49 J	0.36 U	0.35 U	0.4 U	0.44 J
GAMMA-CHLORDANE	11 J	1.7 J	3.4 J	71 J	11 J	3.8 J	3.4 J
HEPTACHLOR	0.39 UJ	0.37 UJ	0.35 UJ	0.36 UJ	0.35 UJ	0.4 UJ	0.36 UJ
HEPTACHLOR EPOXIDE	0.24 J	0.37 UJ	2 J	0.36 U	2.3 J	3	0.51 J
METHOXYCHLOR	3.1 J	3.3 J	17 J	37 J	4 J	7.5 J	3.9 J
TOXAPHENE	39 U	37 U	35 U	36 U	35 U	40 U	36 U

APPENDIX F-1

SUMMARY OF SURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB01-SO-0102	NTC21SB02-SO-0001	NTC21SB03-SO-0001	NTC21SB04-SO-0001	NTC21SB05-SO-0001	NTC21SB06-SO-0001	NTC21SB07-SO-0001
LOCATION ID	NTC21-SB-01	NTC21-SB-02	NTC21-SB-03	NTC21-SB-04	NTC21-SB-05	NTC21-SB-06	NTC21-SB-07
SAMPLE DATE	20090928	20090928	20090928	20090927	20090928	20090927	20090927
SAMPLE TIME	12:00:00	10:20:00	12:20:00	12:50:00	10:00:00	15:10:00	10:40:00
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	1	0	0	0	0	0	0
BOTTODEPTH	2	1	1	1	1	1	1
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SS	SS	SS	SS	SS	SS	SS
Herbicides (ug/kg)							
2,4,5-T	5.94 U	5.58 U	5.27 U	5.43 UJ	5.34 U	6.06 UJ	5.46 UJ
2,4,5-TP (SILVEX)	5.94 U	5.58 U	5.27 U	5.43 U	5.34 U	6.06 U	5.46 U
2,4-D	59.4 U	55.8 U	52.7 U	54.3 UJ	53.4 U	60.6 UJ	54.6 UJ
2,4-DB	59.4 U	55.8 UJ	52.7 UJ	54.3 UJ	53.4 UJ	60.6 UJ	54.6 UJ
DALAPON	148 UJ	139 UJ	132 UJ	136 UJ	133 UJ	152 UJ	136 UJ
DICAMBA	5.94 U	6.91 J	5.41 J	6.77 J	5.34 U	8.07 J	4.86 J
DICHLOROPROP	59.4 U	55.8 U	52.7 U	54.3 U	53.4 U	60.6 U	54.6 U
DINOSEB	29.7 U	27.9 U	26.3 U	27.1 U	26.7 U	30.3 U	27.3 U
MCPA	5940 U	5580 U	5270 U	5430 U	5340 U	6060 U	5460 U
MCPP	5940 U	5580 U	5270 U	5430 U	5340 U	6060 U	5460 U
Dioxins/Furans (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	—	—	—	—	—	—	—
1,2,3,4,6,7,8,9-OCDF	—	—	—	—	—	—	—
1,2,3,4,6,7,8-HPCDD	—	—	—	—	—	—	—
1,2,3,4,6,7,8-HPCDF	—	—	—	—	—	—	—
1,2,3,4,7,8,9-HPCDF	—	—	—	—	—	—	—
1,2,3,4,7,8-HXCDD	—	—	—	—	—	—	—
1,2,3,4,7,8-HXCDF	—	—	—	—	—	—	—
1,2,3,6,7,8-HXCDD	—	—	—	—	—	—	—
1,2,3,6,7,8-HXCDF	—	—	—	—	—	—	—
1,2,3,7,8,9-HXCDD	—	—	—	—	—	—	—
1,2,3,7,8,9-HXCDF	—	—	—	—	—	—	—
1,2,3,7,8-PECDD	—	—	—	—	—	—	—
1,2,3,7,8-PECDF	—	—	—	—	—	—	—
2,3,4,6,7,8-HXCDF	—	—	—	—	—	—	—
2,3,4,7,8-PECDF	—	—	—	—	—	—	—
2,3,7,8-TCDD	—	—	—	—	—	—	—
2,3,7,8-TCDF	—	—	—	—	—	—	—
TOTAL HPCDD	—	—	—	—	—	—	—
TOTAL HPCDF	—	—	—	—	—	—	—
TOTAL HXCDD	—	—	—	—	—	—	—
TOTAL HXCDF	—	—	—	—	—	—	—
TOTAL PECDD	—	—	—	—	—	—	—
TOTAL PECDF	—	—	—	—	—	—	—
TOTAL TCDD	—	—	—	—	—	—	—
TOTAL TCDF	—	—	—	—	—	—	—
TEQ	—	—	—	—	—	—	—
TEQ FULLND	—	—	—	—	—	—	—
Inorganics (mg/kg)							
ALUMINUM	9140	10400	8950	2470	5750	7130	5320
ANTIMONY	0.585 UJ	0.566 UJ	0.627 J	1.38 UJ	0.513 UJ	0.586 UJ	1.36 UJ
ARSENIC	21.1	11.1	9.93	13.4 J	6.05	7.93 J	7.46 J
BARIUM	52.9 J	91.7 J	68.3 J	34.8 J	44.9 J	43.1 J	42.3 J
BERYLLIUM	0.521	0.793	0.846	0.429 J	0.47	0.469 J	0.445 J
CADMIUM	0.554	0.44	0.605	0.338	0.395	0.132	0.644
CALCIUM	54000	56300	57000	89000 J	62700	2240 J	98600 J
CHROMIUM	17.3	15.1	14.1	7.16 J	13.7 J	11.3 J	12.6 J
COBALT	8.64	11	7.43	2.31	6.12	8.67	5.79
COPPER	37.9 J	30.2 J	49.4 J	25.3 J	24.6 J	18.3 J	37.9 J
IRON	48600 J	24100 J	23300 J	26000 J	18200 J	18500 J	18900 J
LEAD	29.6 J	57.3 J	106 J	43 J	42.2 J	25.9 J	8[illegible]

SUMMARY OF SURFAC… …L ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB01-SO-0102	NTC21SB02-SO-0001	NTC21SB03-SO-0001	NTC21SB04-SO-0001	NTC21SB05-SO-0001	NTC21SB06-SO-0001	NTC21SB07-SO-0001
LOCATION ID	NTC21-SB-01	NTC21-SB-02	NTC21-SB-03	NTC21-SB-04	NTC21-SB-05	NTC21-SB-06	NTC21-SB-07
SAMPLE DATE	20090928	20090928	20090928	20090927	20090928	20090927	20090927
SAMPLE TIME	12:00:00	10:20:00	12:20:00	12:50:00	10:00:00	15:10:00	10:40:00
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	1	0	0	0	0	0	0
BOTTODEPTH	2	1	1	1	1	1	1
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SS	SS	SS	SS	SS	SS	SS
Inorganics (mg/kg) (Continued)							
MAGNESIUM	30600	36300	34500	47600	37900 J	1440	53800
MANGANESE	733	965	652	178 J	503	318 J	597 J
MERCURY	0.0548 J	0.092 J	0.144 J	0.0517	0.0693 J	0.0332	0.0854
NICKEL	25.4	21.1	18.9	7.18 J	17.2 J	13.7 J	15.9 J
POTASSIUM	1180 J	1240 J	1060 J	763	970 J	461	981
SELENIUM	0.877 UJ	0.849 UJ	0.79 UJ	0.83 UJ	0.77 UJ	0.351 UJ	1.36 UJ
SILVER	0.117 U	0.113 U	0.105 U	0.277 U	0.103 U	0.117 U	0.271 U
SODIUM	1010	833	1220	845	798	594	384
THALLIUM	0.351 U	0.34 U	0.527 U	0.83 UJ	0.411 U	0.469 UJ	0.814 UJ
VANADIUM	24.2	19.3	16.8	11.3	12.5	22	14.2
ZINC	114 J	151 J	252 J	53.1 J	87.8 J	80.9 J	119 J

APPENDIX F-1

SUMMARY OF SURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB08-SO-0001	NTC21SB09-SO-0001	NTC21SB10-SO-0001	NTC21SB11-SO-0001	NTC21SB12-SO-0001	NTC21SB13-SO-0001
LOCATION ID	NTC21-SB-08	NTC21-SB-09	NTC21-SB-10	NTC21-SB-11	NTC21-SB-12	NTC21-SB-13
SAMPLE DATE	20090928	20090926	20090926	20090926	20090926	20090927
SAMPLE TIME	11:55:00	16:20:00	18:36:00	18:10:00	14:00:00	09:00:00
SAMPLE CODE	NORMAL	ORIG	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO
TOP DEPTH	0	0	0	0	0	0
BOTTODEPTH	1	1	1	1	1	1
DEPTH UNIT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SS	SS	SS	SS	SS	SS
Volatile Organics (ug/kg)						
1,1,1-TRICHLOROETHANE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
1,1,2,2-TETRACHLOROETHANE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
1,1,2-TRICHLOROETHANE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
1,1,2-TRICHLOROTRIFLUOROETHANE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
1,1-DICHLOROETHANE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
1,1-DICHLOROETHENE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
1,2,4-TRICHLOROBENZENE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
1,2-DIBROMO-3-CHLOROPROPANE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
1,2-DIBROMOETHANE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
1,2-DICHLOROBENZENE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
1,2-DICHLOROETHANE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
1,2-DICHLOROPROPANE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
1,3-DICHLOROBENZENE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
1,4-DICHLOROBENZENE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
2-BUTANONE	5.4 UJ	4.4 UJ	5.3 UJ	5.2 UJ	5.6 UJ	6.5 UJ
2-HEXANONE	5.4 U	4.4 UJ	5.3 UJ	5.2 UJ	5.6 UJ	6.5 UJ
4-METHYL-2-PENTANONE	5.4 UJ	4.4 UJ	5.3 UJ	5.2 UJ	5.6 UJ	6.5 UJ
ACETONE	5.4 U	23 J	5.3 UJ	5.2 UJ	5.6 UJ	54 J
BENZENE	5.4 U	4.4 U	0.56 J	5.2 U	0.63 J	6.5 UJ
BROMODICHLOROMETHANE	11 U	8.9 U	10 U	10 U	11 U	13 UJ
BROMOFORM	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
BROMOMETHANE	11 U	8.9 U	10 U	10 U	11 U	13 UJ
CARBON DISULFIDE	5.4 U	7	5.3 U	5.2 U	2.1 J	6.5 UJ
CARBON TETRACHLORIDE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
CHLOROBENZENE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
CHLORODIBROMOMETHANE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
CHLOROETHANE	11 U	8.9 U	10 U	10 U	11 U	13 UJ
CHLOROFORM	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
CHLOROMETHANE	11 U	8.9 U	10 U	10 U	11 U	13 UJ
CIS-1,2-DICHLOROETHENE	11 U	8.9 U	10 U	10 U	11 U	13 UJ
CIS-1,3-DICHLOROPROPENE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
CYCLOHEXANE	1.7 J	4.4 U	2.9 J	5.2 U	2.3 J	6.5 UJ
DICHLORODIFLUOROMETHANE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
ETHYLBENZENE	5.4 U	4.4 U	5.3 U	0.9 J	5.6 U	6.5 UJ
ISOPROPYLBENZENE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
METHYL ACETATE	11 U	8.9 U	10 U	10 U	11 U	13 UJ
METHYL CYCLOHEXANE	2.6 J	4.4 U	3.2 J	5.2 U	3.7 J	0.88 J
METHYL TERT-BUTYL ETHER	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
METHYLENE CHLORIDE	2 U	1.8 U	2.1 U	14 U	2.3 U	1.5 U
STYRENE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
TETRACHLOROETHENE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
TOLUENE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
TOTAL XYLENES	5.4 U	4.4 U	5.3 U	1.6 J	5.6 U	6.5 UJ
TRANS-1,2-DICHLOROETHENE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
TRANS-1,3-DICHLOROPROPENE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
TRICHLOROETHENE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
TRICHLOROFLUOROMETHANE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ
VINYL CHLORIDE	5.4 U	4.4 U	5.3 U	5.2 U	5.6 U	6.5 UJ

SUMMARY OF SURFAC... ...L ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB08-SO-0001	NTC21SB09-SO-0001	NTC21SB10-SO-0001	NTC21SB11-SO-0001	NTC21SB12-SO-0001	NTC21SB13-SO-0001
LOCATION ID	NTC21-SB-08	NTC21-SB-09	NTC21-SB-10	NTC21-SB-11	NTC21-SB-12	NTC21-SB-13
SAMPLE DATE	20090928	20090926	20090926	20090926	20090926	20090927
SAMPLE TIME	11:55:00	16:20:00	18:36:00	18:10:00	14:00:00	09:00:00
SAMPLE CODE	NORMAL	ORIG	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO
TOP DEPTH	0	0	0	0	0	0
BOTTODEPTH	1	1	1	1	1	1
DEPTH UNIT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SS	SS	SS	SS	SS	SS
Semivolatile Organics (ug/kg)						
1,1-BIPHENYL	360 U	360 U	370 U	360 U	390 U	430 U
2,2'-OXYBIS(1-CHLOROPROPANE)	720 U	730 U	740 U	720 U	780 U	860 U
2,4,5-TRICHLOROPHENOL	360 U	360 U	370 UJ	360 U	390 U	430 U
2,4,6-TRICHLOROPHENOL	360 U	360 U	370 UJ	360 U	390 U	430 U
2,4-DICHLOROPHENOL	360 U	360 U	370 UJ	360 U	390 U	430 U
2,4-DIMETHYLPHENOL	720 U	730 UJ	740 UJ	720 UJ	780 UJ	860 U
2,4-DINITROPHENOL	3600 U	3600 U	3700 UJ	3600 U	3900 U	4300 U
2,4-DINITROTOLUENE	360 U	360 U	370 U	360 U	390 U	430 U
2,6-DINITROTOLUENE	360 U	360 U	370 U	360 U	390 U	430 U
2-CHLORONAPHTHALENE	360 U	360 U	370 U	360 U	390 U	430 U
2-CHLOROPHENOL	360 U	360 UJ	370 UJ	360 UJ	390 UJ	430 U
2-METHYLNAPHTHALENE	230	340	280	320	450	840
2-METHYLPHENOL	360 U	360 U	370 UJ	360 U	390 U	430 U
2-NITROANILINE	1400 U	1500 UJ	1500 UJ	1400 UJ	1600 UJ	1700 U
2-NITROPHENOL	360 U	360 U	370 UJ	360 U	390 U	430 U
3,3'-DICHLOROBENZIDINE	360 U	360 U	370 U	360 U	390 U	430 U
3-NITROANILINE	1400 U	1500 U	1500 U	1400 U	1600 U	1700 U
4,6-DINITRO-2-METHYLPHENOL	1400 U	1500 UJ	1500 UJ	1400 UJ	1600 UJ	1700 U
4-BROMOPHENYL PHENYL ETHER	360 U	360 U	370 U	360 U	390 U	430 U
4-CHLORO-3-METHYLPHENOL	360 U	360 U	370 UJ	360 U	390 U	430 U
4-CHLOROANILINE	360 U	360 U	370 U	360 U	390 U	430 U
4-CHLOROPHENYL PHENYL ETHER	360 U	360 U	370 U	360 U	390 U	430 U
4-METHYLPHENOL	360 U	360 U	370 UJ	360 U	390 U	430 U
4-NITROANILINE	1400 U	1500 U	1500 U	1400 U	1600 U	1700 U
4-NITROPHENOL	1400 UJ	1500 UJ	1500 UJ	1400 UJ	1600 UJ	1700 U
ACENAPHTHENE	42	67	57	290	49	4.3 U
ACENAPHTHYLENE	110	3.6 U	35	25	3.9 U	4.3 U
ACETOPHENONE	48 J	360 U	370 U	360 U	390 U	430 U
ANTHRACENE	150	110	170	590	150	4.3 U
ATRAZINE	360 UJ	360 U	370 U	360 U	390 U	430 U
BENZALDEHYDE	360 U	360 U	370 U	360 U	390 U	430 UR
BENZO(A)ANTHRACENE	520 J	250 J	390	1600 J	400	4.3 U
BENZO(A)PYRENE	830 J	460 J	690	2900 J	430	4.3 U
BENZO(B)FLUORANTHENE	1200 J	670 J	970	4100 J	740	4.3 U
BENZO(G,H,I)PERYLENE	460 J	350 J	480	2000 J	210	410
BENZO(K)FLUORANTHENE	560 J	290 J	260	1600 J	220	4.3 U
BIS(2-CHLOROETHOXY)METHANE	360 U	360 U	370 U	360 U	390 U	430 U
BIS(2-CHLOROETHYL)ETHER	360 U	360 U	370 U	360 U	390 U	430 U
BIS(2-ETHYLHEXYL)PHTHALATE	190 J	130 J	130 J	280 J	390 UJ	78 J
BUTYL BENZYL PHTHALATE	97 J	360 UJ	370 UJ	360 UJ	390 UJ	430 UJ
CAPROLACTAM	360 U	360 U	370 U	360 U	390 U	430 U
CARBAZOLE	720 U	730 U	740 U	720 U	780 U	860 U
CHRYSENE	660 J	320 J	390	1900 J	470	4.3 UJ
DI-N-BUTYL PHTHALATE	360 UJ	37 J	190 J	360 U	390 U	430 U
DI-N-OCTYL PHTHALATE	360 UJ	360 UJ	370 UJ	360 UJ	390 UJ	430 UJ
DIBENZO(A,H)ANTHRACENE	140 J	81 J	150	470 J	66	4.3 U
DIBENZOFURAN	76 J	110 J	90 J	180 J	240 J	320 J
DIETHYL PHTHALATE	360 U	360 U	370 U	360 U	390 U	430 U
DIMETHYL PHTHALATE	360 U	360 U	370 U	360 U	390 U	430 U
FLUORANTHENE	1200	860	1000	5700	1000	2000
FLUORENE	3.6 U	3.6 UJ	50	220	3.9 U	4.3 U

APPENDIX F-1

SUMMARY OF SURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB08-SO-0001	NTC21SB09-SO-0001	NTC21SB10-SO-0001	NTC21SB11-SO-0001	NTC21SB12-SO-0001	NTC21SB13-SO-0001
LOCATION ID	NTC21-SB-08	NTC21-SB-09	NTC21-SB-10	NTC21-SB-11	NTC21-SB-12	NTC21-SB-13
SAMPLE DATE	20090928	20090926	20090926	20090926	20090926	20090927
SAMPLE TIME	11:55:00	16:20:00	18:36:00	18:10:00	14:00:00	09:00:00
SAMPLE CODE	NORMAL	ORIG	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO
TOP DEPTH	0	0	0	0	0	0
BOTTODEPTH	1	1	1	1	1	1
DEPTH UNIT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SS	SS	SS	SS	SS	SS
Semivolatile Organics (ug/kg) (Continued)						
HEXACHLOROBENZENE	360 U	360 U	370 U	360 U	390 U	430 U
HEXACHLOROBUTADIENE	360 U	360 U	370 U	360 U	390 U	430 U
HEXACHLOROCYCLOPENTADIENE	360 U	360 UJ	370 UJ	360 UJ	390 UJ	430 U
HEXACHLOROETHANE	720 U	730 U	740 U	720 U	780 U	860 U
INDENO(1,2,3-CD)PYRENE	630 J	400 J	630	2700 J	300	4.3 U
ISOPHORONE	360 U	360 U	370 U	360 U	390 U	430 U
N-NITROSO-DI-N-PROPYLAMINE	360 U	360 UJ	370 UJ	360 UJ	390 UJ	430 U
N-NITROSODIPHENYLAMINE	360 U	360 U	370 U	360 U	390 U	430 U
NAPHTHALENE	190	280	210	190	240	350
NITROBENZENE	360 U	360 UJ	370 UJ	360 UJ	390 UJ	430 U
PENTACHLOROPHENOL	1400 U	1500 U	1500 UJ	1400 U	1600 U	1700 U
PHENANTHRENE	560	760	650	3100	890	2900
PHENOL	360 U	360 U	370 UJ	360 U	390 U	430 U
PYRENE	1100	760	920	4800	860	1700
BAP EQUIVALENT	1211.26	676.22	1041.99	4227.9	642.67	0 U
BAP EQUIVALENT FULLND	1211.26	676.22	1041.99	4227.9	642.67	9.9373
TOTAL PAHS	8582	5998	7332	32505	6475	8200
TOTAL PAHS FULLND	8585.6	6005.2	7332	32505	6482.8	8247.3
Pesticides/PCBS (ug/kg)						
4,4'-DDD	51 J	480	520 J	230 J	3.9 J	1.2 J
4,4'-DDE	48	65 J	350 J	53 J	7.2 J	1.4 J
4,4'-DDT	72 J	62 J	740 J	34 J	7.6 J	9.9 J
ALDRIN	0.36 UJ	0.36 UJ	0.37 UJ	0.36 UJ	0.39 UJ	0.43 UJ
ALPHA-BHC	8.9 J	0.36 U	0.37 U	0.36 U	0.39 U	0.43 U
ALPHA-CHLORDANE	3.2 J	7.3 J	7.5 J	4.3 J	0.39 UJ	0.43 UJ
AROCLOR-1016	18.3 U	18.7 U	19 U	18.5 U	20 U	21.9 U
AROCLOR-1221	18.3 U	18.7 U	19 U	18.5 U	20 U	21.9 U
AROCLOR-1232	18.3 U	18.7 U	19 U	18.5 U	20 U	21.9 U
AROCLOR-1242	18.3 U	18.7 U	19 U	18.5 U	20 U	21.9 U
AROCLOR-1248	18.3 U	18.7 U	19 U	18.5 U	20 U	21.9 U
AROCLOR-1254	18.3 U	18.7 U	19 U	18.5 U	20 U	21.9 U
AROCLOR-1260	84 J	130 J	720 J	390 J	20 UJ	120 J
BETA-BHC	0.36 U	0.36 UJ	0.37 UJ	0.36 UJ	0.39 UJ	0.43 U
DELTA-BHC	0.36 U	0.36 UJ	3.5 J	0.36 UJ	0.56 J	0.43 U
DIELDRIN	3.5 J	2.5 J	12 J	6.8 J	0.79 UJ	3.1 J
ENDOSULFAN I	0.36 UJ	0.36 UJ	14 J	4.1 J	0.55 J	0.43 UJ
ENDOSULFAN II	0.72 UJ	4 J	4.6 J	0.73 UJ	0.79 UJ	1.5 J
ENDOSULFAN SULFATE	1.8 J	6.7 J	18 J	13 J	0.79 UJ	2.7 J
ENDRIN	0.72 UJ	7.3 J	224	0.73 U	0.79 UJ	0.86 U
ENDRIN ALDEHYDE	0.72 UJ	6.8 J	28 J	0.73 UJ	1.6 J	0.86 UJ
ENDRIN KETONE	0.72 UJ	0.74 UJ	0.75 UJ	0.73 UJ	0.79 UJ	0.86 UJ
GAMMA-BHC (LINDANE)	0.36 U	0.36 U	0.37 U	4.7 J	0.39 U	0.96
GAMMA-CHLORDANE	7 J	5.7 J	189 J	8.3 J	1.3 J	2.2 J
HEPTACHLOR	0.36 UJ	0.36 UJ	0.37 UJ	0.36 UJ	0.39 UJ	0.43 UJ
HEPTACHLOR EPOXIDE	1 J	0.36 UJ	2.7 J	0.36 UJ	0.69 J	1.1 J
METHOXYCHLOR	9.4 J	0.36 UJ	0.37 UJ	0.36 UJ	6.6 J	17 J
TOXAPHENE	36 U	36 U	37 U	36 U	39 U	43 U

SUMMARY OF SURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB08-SO-0001	NTC21SB09-SO-0001	NTC21SB10-SO-0001	NTC21SB11-SO-0001	NTC21SB12-SO-0001	NTC21SB13-SO-0001
LOCATION ID	NTC21-SB-08	NTC21-SB-09	NTC21-SB-10	NTC21-SB-11	NTC21-SB-12	NTC21-SB-13
SAMPLE DATE	20090928	20090926	20090926	20090926	20090926	20090927
SAMPLE TIME	11:55:00	16:20:00	18:36:00	18:10:00	14:00:00	09:00:00
SAMPLE CODE	NORMAL	ORIG	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO
TOP DEPTH	0	0	0	0	0	0
BOTTODEPTH	1	1	1	1	1	1
DEPTH UNIT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SS	SS	SS	SS	SS	SS
Herbicides (ug/kg)						
2,4,5-T	5.39 U	5.49 UJ	5.58 UJ	5.43 UJ	5.89 UJ	6.44 UJ
2,4,5-TP (SILVEX)	5.39 U	5.49 U	5.58 U	5.43 U	5.89 U	6.44 U
2,4-D	53.9 U	54.9 U	55.8 U	54.3 U	58.9 U	217 J
2,4-DB	53.9 UJ	54.9 U	55.8 U	54.3 U	58.9 U	64.4 UJ
DALAPON	135 UJ	137 U	139 U	136 U	147 U	161 UJ
DICAMBA	5.39 U	5.49 U	5.58 U	5.43 U	5.89 U	8.56 J
DICHLOROPROP	53.9 U	54.9 U	55.8 U	54.3 U	58.9 U	64.4 U
DINOSEB	27 U	27.4 U	27.9 U	27.2 U	29.5 U	32.2 U
MCPA	5390 U	5490 UJ	5580 UJ	5430 UJ	5890 UJ	6440 U
MCPP	5390 U	5490 U	5580 U	5430 U	5890 U	6440 U
Dioxins/Furans (ng/kg)						
1,2,3,4,6,7,8,9-OCDD	—	1310	—	—	—	—
1,2,3,4,6,7,8,9-OCDF	—	141	—	—	—	—
1,2,3,4,6,7,8-HPCDD	—	169	—	—	—	—
1,2,3,4,6,7,8-HPCDF	—	82.4	—	—	—	—
1,2,3,4,7,8,9-HPCDF	—	4.08 J	—	—	—	—
1,2,3,4,7,8-HXCDD	—	1.9 J	—	—	—	—
1,2,3,4,7,8-HXCDF	—	5.91	—	—	—	—
1,2,3,6,7,8-HXCDD	—	7.9	—	—	—	—
1,2,3,6,7,8-HXCDF	—	11.6	—	—	—	—
1,2,3,7,8,9-HXCDD	—	5.17	—	—	—	—
1,2,3,7,8,9-HXCDF	—	2.68 J	—	—	—	—
1,2,3,7,8-PECDD	—	5.9 J	—	—	—	—
1,2,3,7,8-PECDF	—	1.92 J	—	—	—	—
2,3,4,6,7,8-HXCDF	—	26.2	—	—	—	—
2,3,4,7,8-PECDF	—	57.5	—	—	—	—
2,3,7,8-TCDD	—	0.816 J	—	—	—	—
2,3,7,8-TCDF	—	3.17	—	—	—	—
TOTAL HPCDD	—	326	—	—	—	—
TOTAL HPCDF	—	202	—	—	—	—
TOTAL HXCDD	—	67	—	—	—	—
TOTAL HXCDF	—	393 J	—	—	—	—
TOTAL PECDD	—	19.4 J	—	—	—	—
TOTAL PECDF	—	712 J	—	—	—	—
TOTAL TCDD	—	10.8	—	—	—	—
TOTAL TCDF	—	215 J	—	—	—	—
TEQ	—	33.4667	—	—	—	—
TEQ FULLND	—	33.4667	—	—	—	—
Inorganics (mg/kg)						
ALUMINUM	5200	4350	6720	2790	3280	6210
ANTIMONY	0.933	2.06	5.22	1.37 U	1.51 U	2.51 J
ARSENIC	9.53	8.14	11.9	5.6	12.9	10.7 J
BARIUM	55.6 J	86.6 J	161 J	82.3 J	49.6 J	69.8 J
BERYLLIUM	0.485	0.929	0.826	0.646	0.508	2.44 J
CADMIUM	1.24	3.81	13	1.94	0.507	8.45
CALCIUM	76300	32000 J	42200	62100	83300	21100 J
CHROMIUM	9.71	163 J	36.9	11.1	12.6	14.8 J
COBALT	6.07	5.19	6.67	2.9	3.27	17.7
COPPER	47	129 J	835	104	31.6	296 J
IRON	18400 J	23400 J	35000 J	15000 J	25800 J	52200 J
LEAD	65.3	167 J	428	118	51.3	407 J

APPENDIX F-1

SUMMARY OF SURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB08-SO-0001	NTC21SB09-SO-0001	NTC21SB10-SO-0001	NTC21SB11-SO-0001	NTC21SB12-SO-0001	NTC21SB13-SO-0001
LOCATION ID	NTC21-SB-08	NTC21-SB-09	NTC21-SB-10	NTC21-SB-11	NTC21-SB-12	NTC21-SB-13
SAMPLE DATE	20090928	20090926	20090926	20090926	20090926	20090927
SAMPLE TIME	11:55:00	16:20:00	18:36:00	18:10:00	14:00:00	09:00:00
SAMPLE CODE	NORMAL	ORIG	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO
TOP DEPTH	0	0	0	0	0	0
BOTTODEPTH	1	1	1	1	1	1
DEPTH UNIT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SS	SS	SS	SS	SS	SS
Inorganics (mg/kg) (Continued)						
MAGNESIUM	38800	13800 J	13600	29100	39600	8120
MANGANESE	456	173	416	206	226	494 J
MERCURY	0.0612 J	0.495	8.98	0.0648	0.585	0.106
NICKEL	15.9	56.2 J	52.3	10.9	10.4	43.1 J
POTASSIUM	749	642	846	438	428	435
SELENIUM	0.809 UJ	0.827 U	0.764 U	0.823 U	0.906 U	0.924 UJ
SILVER	0.108 U	0.515	1.41	0.274 U	0.302 U	0.308 U
SODIUM	230	868	1000	986	378	588
THALLIUM	0.431 U	0.827 U	0.764 U	0.823 U	0.906 U	0.924 UJ
VANADIUM	12.5 J	25.7	21.2	11.2	13.8	22.3
ZINC	172	190	1230	125	70.9	884 J

SUMMARY OF SURFAC _ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB14-SO-0001	NTC21SB15-SO-0001	NTC21SB16-SO-0001	NTC21SB17-SO-0001	NTC21SB18-SO-0001	NTC21SB19-SO-0001	SAMPLE ID
LOCATION ID	NTC21-SB-14	NTC21-SB-15	NTC21-SB-16	NTC21-SB-17	NTC21-SB-18	NTC21-SB-19	LOCATION ID
SAMPLE DATE	20090927	20090927	20090927	20090926	20090926	20090927	SAMPLE DATE
SAMPLE TIME	09:30:00	10:00:00	17:00:00	13:26:00	12:47:00	17:40:00	SAMPLE TIME
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	SAMPLE CODE
MATRIX	SO	SO	SO	SO	SO	SO	MATRIX
TOP DEPTH	0	0	0	0	0	0	TOP DEPTH
BOTTODEPTH	1	1	1	1	1	1	BOTTODEPTH
DEPTH UNIT	FT	FT	FT	FT	FT	FT	DEPTH UNIT
SUBMATRIX	SS	SS	SS	SS	SS	SS	SUBMATRIX
Volatile Organics (ug/kg)							**Volatile Organics (ug/kg)**
1,1,1-TRICHLOROETHANE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	1,1,1-TRICHLOROETHANE
1,1,2,2-TETRACHLOROETHANE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	1,1,2,2-TETRACHLOROETHANE
1,1,2-TRICHLOROETHANE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	1,1,2-TRICHLOROETHANE
1,1,2-TRICHLOROTRIFLUOROETHANE	6.8 U	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	1,1,2-TRICHLOROTRIFLUOROETHANE
1,1-DICHLOROETHANE	6.8 UJ	5.5 UJ	5.3 UJ	7.8 U	5.2 U	4.5 UJ	1,1-DICHLOROETHANE
1,1-DICHLOROETHENE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	1,1-DICHLOROETHENE
1,2,4-TRICHLOROBENZENE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	1,2,4-TRICHLOROBENZENE
1,2-DIBROMO-3-CHLOROPROPANE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	1,2-DIBROMO-3-CHLOROPROPANE
1,2-DIBROMOETHANE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	1,2-DIBROMOETHANE
1,2-DICHLOROBENZENE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	1,2-DICHLOROBENZENE
1,2-DICHLOROETHANE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	1,2-DICHLOROETHANE
1,2-DICHLOROPROPANE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	1,2-DICHLOROPROPANE
1,3-DICHLOROBENZENE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	1,3-DICHLOROBENZENE
1,4-DICHLOROBENZENE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	1,4-DICHLOROBENZENE
2-BUTANONE	6.8 UJ	5.5 U	5.3 U	7.8 UJ	5.2 UJ	4.5 U	2-BUTANONE
2-HEXANONE	6.8 UJ	5.5 U	5.3 U	7.8 UJ	5.2 UJ	4.5 U	2-HEXANONE
4-METHYL-2-PENTANONE	6.8 U	5.5 U	5.3 U	7.8 UJ	5.2 UJ	4.5 U	4-METHYL-2-PENTANONE
ACETONE	6.8 U	5.5 U	5.3 U	47 J	5.2 UJ	4.5 U	ACETONE
BENZENE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	BENZENE
BROMODICHLOROMETHANE	14 UJ	11 U	10 U	16 U	10 U	8.9 U	BROMODICHLOROMETHANE
BROMOFORM	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	BROMOFORM
BROMOMETHANE	14 U	11 U	10 U	16 U	10 U	8.9 U	BROMOMETHANE
CARBON DISULFIDE	6.4 J	5.6	5.3 U	16	5.2 U	2.6 J	CARBON DISULFIDE
CARBON TETRACHLORIDE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	CARBON TETRACHLORIDE
CHLOROBENZENE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	CHLOROBENZENE
CHLORODIBROMOMETHANE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	CHLORODIBROMOMETHANE
CHLOROETHANE	14 U	11 U	10 U	16 U	10 U	8.9 U	CHLOROETHANE
CHLOROFORM	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	CHLOROFORM
CHLOROMETHANE	14 U	11 U	10 U	16 U	10 U	8.9 U	CHLOROMETHANE
CIS-1,2-DICHLOROETHENE	14 UJ	11 U	10 U	16 U	10 U	8.9 U	CIS-1,2-DICHLOROETHENE
CIS-1,3-DICHLOROPROPENE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	CIS-1,3-DICHLOROPROPENE
CYCLOHEXANE	6.8 U	5.5 U	5.3 U	7.8 U	0.71 J	1.3 J	CYCLOHEXANE
DICHLORODIFLUOROMETHANE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	DICHLORODIFLUOROMETHANE
ETHYLBENZENE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	ETHYLBENZENE
ISOPROPYLBENZENE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	ISOPROPYLBENZENE
METHYL ACETATE	14 U	11 U	10 U	16 U	10 U	8.9 U	METHYL ACETATE
METHYL CYCLOHEXANE	0.56 J	0.86 J	0.72 J	0.78 J	1.2 J	2.6 J	METHYL CYCLOHEXANE
METHYL TERT-BUTYL ETHER	6.8 U	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	METHYL TERT-BUTYL ETHER
METHYLENE CHLORIDE	1.5 U	1.3 U	1.4 U	3.2 U	2 U	1 U	METHYLENE CHLORIDE
STYRENE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	STYRENE
TETRACHLOROETHENE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	1.4 J	TETRACHLOROETHENE
TOLUENE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	TOLUENE
TOTAL XYLENES	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	TOTAL XYLENES
TRANS-1,2-DICHLOROETHENE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	TRANS-1,2-DICHLOROETHENE
TRANS-1,3-DICHLOROPROPENE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	TRANS-1,3-DICHLOROPROPENE
TRICHLOROETHENE	6.8 UJ	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	TRICHLOROETHENE
TRICHLOROFLUOROMETHANE	6.8 U	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	TRICHLOROFLUOROMETHANE
VINYL CHLORIDE	6.8 U	5.5 U	5.3 U	7.8 U	5.2 U	4.5 U	VINYL CHLORIDE

APPENDIX F-1

SUMMARY OF SURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB14-SO-0001	NTC21SB15-SO-0001	NTC21SB16-SO-0001	NTC21SB17-SO-0001	NTC21SB18-SO-0001	NTC21SB19-SO-0001	SAMPLE ID
LOCATION ID	NTC21-SB-14	NTC21-SB-15	NTC21-SB-16	NTC21-SB-17	NTC21-SB-18	NTC21-SB-19	LOCATION ID
SAMPLE DATE	20090927	20090927	20090927	20090926	20090926	20090927	SAMPLE DATE
SAMPLE TIME	09:30:00	10:00:00	17:00:00	13:26:00	12:47:00	17:40:00	SAMPLE TIME
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	SAMPLE CODE
MATRIX	SO	SO	SO	SO	SO	SO	MATRIX
TOP DEPTH	0	0	0	0	0	0	TOP DEPTH
BOTTODEPTH	1	1	1	1	1	1	BOTTODEPTH
DEPTH UNIT	FT	FT	FT	FT	FT	FT	DEPTH UNIT
SUBMATRIX	SS	SS	SS	SS	SS	SS	SUBMATRIX
Semivolatile Organics (ug/kg)							**Semivolatile Organics (ug/kg)**
1,1-BIPHENYL	410 U	400 U	370 U	400 U	390 U	360 U	1,1-BIPHENYL
2,2'-OXYBIS(1-CHLOROPROPANE)	810 U	800 U	750 U	800 U	780 U	720 U	2,2'-OXYBIS(1-CHLOROPROPANE)
2,4,5-TRICHLOROPHENOL	410 UJ	400 U	370 U	400 U	390 U	360 U	2,4,5-TRICHLOROPHENOL
2,4,6-TRICHLOROPHENOL	410 U	400 U	370 U	400 U	390 U	360 U	2,4,6-TRICHLOROPHENOL
2,4-DICHLOROPHENOL	410 U	400 U	370 U	400 U	390 U	360 U	2,4-DICHLOROPHENOL
2,4-DIMETHYLPHENOL	810 U	800 U	750 U	800 UJ	780 UJ	720 U	2,4-DIMETHYLPHENOL
2,4-DINITROPHENOL	4100 UR	4000 U	3700 U	4000 U	3900 U	3600 U	2,4-DINITROPHENOL
2,4-DINITROTOLUENE	410 UJ	400 U	370 U	400 U	390 U	360 U	2,4-DINITROTOLUENE
2,6-DINITROTOLUENE	410 UJ	400 U	370 U	400 U	390 U	360 U	2,6-DINITROTOLUENE
2-CHLORONAPHTHALENE	410 U	400 U	370 U	400 U	390 U	360 U	2-CHLORONAPHTHALENE
2-CHLOROPHENOL	410 U	400 U	370 U	400 UJ	390 UJ	360 U	2-CHLOROPHENOL
2-METHYLNAPHTHALENE	900	540	460	94	100	98	2-METHYLNAPHTHALENE
2-METHYLPHENOL	410 U	400 U	370 U	400 U	390 U	360 U	2-METHYLPHENOL
2-NITROANILINE	1600 U	1600 U	1500 U	1600 UJ	1600 UJ	1400 U	2-NITROANILINE
2-NITROPHENOL	410 UJ	400 U	370 U	400 U	390 U	360 U	2-NITROPHENOL
3,3'-DICHLOROBENZIDINE	410 UR	400 U	370 U	400 U	390 U	360 U	3,3'-DICHLOROBENZIDINE
3-NITROANILINE	1600 UJ	1600 U	1500 U	1600 U	1600 U	1400 U	3-NITROANILINE
4,6-DINITRO-2-METHYLPHENOL	1600 UJ	1600 U	1500 U	1600 UJ	1600 UJ	1400 U	4,6-DINITRO-2-METHYLPHENOL
4-BROMOPHENYL PHENYL ETHER	410 U	400 U	370 U	400 U	390 U	360 U	4-BROMOPHENYL PHENYL ETHER
4-CHLORO-3-METHYLPHENOL	410 U	400 U	370 U	400 U	390 U	360 U	4-CHLORO-3-METHYLPHENOL
4-CHLOROANILINE	410 U	400 U	370 U	400 U	390 U	360 U	4-CHLOROANILINE
4-CHLOROPHENYL PHENYL ETHER	410 U	400 U	370 U	400 U	390 U	360 U	4-CHLOROPHENYL PHENYL ETHER
4-METHYLPHENOL	410 U	400 U	370 U	400 U	390 U	360 U	4-METHYLPHENOL
4-NITROANILINE	1600 UJ	1600 U	1500 U	1600 U	1600 U	1400 U	4-NITROANILINE
4-NITROPHENOL	1600 U	1600 U	1500 U	1600 UJ	1600 UJ	1400 U	4-NITROPHENOL
ACENAPHTHENE	4.1 U	4 U	3.7 U	280	13	24	ACENAPHTHENE
ACENAPHTHYLENE	4.1 U	4 U	3.7 U	70	34	3.6 U	ACENAPHTHYLENE
ACETOPHENONE	410 U	400 U	370 U	400 U	390 U	360 U	ACETOPHENONE
ANTHRACENE	4.1 U	4 U	3.7 U	300	37	3.6 U	ANTHRACENE
ATRAZINE	410 UJ	400 U	370 U	400 U	390 U	360 U	ATRAZINE
BENZALDEHYDE	410 UR	400 UR	370 UR	400 U	390 U	360 UR	BENZALDEHYDE
BENZO(A)ANTHRACENE	280	200 J	110	350	140	150	BENZO(A)ANTHRACENE
BENZO(A)PYRENE	860 J	4 UJ	3.7 U	600	200	250	BENZO(A)PYRENE
BENZO(B)FLUORANTHENE	4.1 UJ	550 J	290	940	310	440	BENZO(B)FLUORANTHENE
BENZO(G,H,I)PERYLENE	180 J	4 UJ	3.7 U	360	150	170	BENZO(G,H,I)PERYLENE
BENZO(K)FLUORANTHENE	4.1 UJ	540 J	270	320	110	430	BENZO(K)FLUORANTHENE
BIS(2-CHLOROETHOXY)METHANE	410 U	400 U	370 U	400 U	390 U	360 U	BIS(2-CHLOROETHOXY)METHANE
BIS(2-CHLOROETHYL)ETHER	410 U	400 U	370 U	400 U	390 U	360 U	BIS(2-CHLOROETHYL)ETHER
BIS(2-ETHYLHEXYL)PHTHALATE	51 J	400 UJ	77 J	400 U	390 U	110 J	BIS(2-ETHYLHEXYL)PHTHALATE
BUTYL BENZYL PHTHALATE	410 U	400 UJ	370 UJ	400 UJ	390 UJ	360 UJ	BUTYL BENZYL PHTHALATE
CAPROLACTAM	410 U	400 U	370 U	400 U	390 U	360 U	CAPROLACTAM
CARBAZOLE	810 U	800 U	750 U	800 U	780 U	720 U	CARBAZOLE
CHRYSENE	410 J	250 J	130 J	480	190	190 J	CHRYSENE
DI-N-BUTYL PHTHALATE	410 UJ	400 U	370 U	400 U	390 U	360 U	DI-N-BUTYL PHTHALATE
DI-N-OCTYL PHTHALATE	410 UJ	400 UJ	370 UJ	400 UJ	390 UJ	360 UJ	DI-N-OCTYL PHTHALATE
DIBENZO(A,H)ANTHRACENE	4.1 UJ	4 UJ	3.7 U	100	44	3.6 U	DIBENZO(A,H)ANTHRACENE
DIBENZOFURAN	320 J	250 J	130 J	210 J	46 J	39 J	DIBENZOFURAN
DIETHYL PHTHALATE	410 U	400 U	370 U	400 U	390 U	360 U	DIETHYL PHTHALATE
DIMETHYL PHTHALATE	410 UJ	400 U	370 U	400 U	390 U	360 U	DIMETHYL PHTHALATE
FLUORANTHENE	810	670	260	1100	340	400	FLUORANTHENE
FLUORENE	4.1 U	4 U	3.7 U	320	11	3.6 U	FLUORENE

SUMMARY OF SURFAC[illegible]L ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB14-SO-0001	NTC21SB15-SO-0001	NTC21SB16-SO-0001	NTC21SB17-SO-0001	NTC21SB18-SO-0001	NTC21SB19-SO-0001	SAMPLE ID
LOCATION ID	NTC21-SB-14	NTC21-SB-15	NTC21-SB-16	NTC21-SB-17	NTC21-SB-18	NTC21-SB-19	LOCATION ID
SAMPLE DATE	20090927	20090927	20090927	20090926	20090926	20090927	SAMPLE DATE
SAMPLE TIME	09:30:00	10:00:00	17:00:00	13:26:00	12:47:00	17:40:00	SAMPLE TIME
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	SAMPLE CODE
MATRIX	SO	SO	SO	SO	SO	SO	MATRIX
TOP DEPTH	0	0	0	0	0	0	TOP DEPTH
BOTTODEPTH	1	1	1	1	1	1	BOTTODEPTH
DEPTH UNIT	FT	FT	FT	FT	FT	FT	DEPTH UNIT
SUBMATRIX	SS	SS	SS	SS	SS	SS	SUBMATRIX
Semivolatile Organics (ug/kg) (Continued)							**Semivolatile Organics (ug/kg) (Continued)**
HEXACHLOROBENZENE	410 U	400 U	370 U	400 U	390 U	360 U	HEXACHLOROBENZENE
HEXACHLOROBUTADIENE	410 U	400 U	370 U	400 U	390 U	360 U	HEXACHLOROBUTADIENE
HEXACHLOROCYCLOPENTADIENE	410 UJ	400 U	370 U	400 UJ	390 UJ	360 U	HEXACHLOROCYCLOPENTADIENE
HEXACHLOROETHANE	810 U	800 U	750 U	800 U	780 U	720 U	HEXACHLOROETHANE
INDENO(1,2,3-CD)PYRENE	4.1 UJ	4 UJ	150	510	200	250	INDENO(1,2,3-CD)PYRENE
ISOPHORONE	410 U	400 U	370 U	400 U	390 U	360 U	ISOPHORONE
N-NITROSO-DI-N-PROPYLAMINE	410 U	400 U	370 U	400 UJ	390 UJ	360 U	N-NITROSO-DI-N-PROPYLAMINE
N-NITROSODIPHENYLAMINE	410 U	400 U	370 U	400 UJ	390 U	360 U	N-NITROSODIPHENYLAMINE
NAPHTHALENE	350	350	160	53	49	44	NAPHTHALENE
NITROBENZENE	410 U	400 U	370 U	400 U	390 UJ	360 U	NITROBENZENE
PENTACHLOROPHENOL	1600 U	1600 U	1500 U	1600 U	1600 U	1400 U	PENTACHLOROPHENOL
PHENANTHRENE	1300	1100	1300	1100	290	250	PHENANTHRENE
PHENOL	410 U	400 U	370 U	400 U	390 U	360 U	PHENOL
PYRENE	740	570	240	960	290	360	PYRENE
BAP EQUIVALENT	888.41	80.65	57.83	883.68	310.29	338.49	BAP EQUIVALENT
BAP EQUIVALENT FULLND	893.371	89.05	65.23	883.68	310.29	342.09	BAP EQUIVALENT FULLND
TOTAL PAHS	5830	4770	3370	7937	2508	3056	TOTAL PAHS
TOTAL PAHS FULLND	5862.8	4802	3395.9	7937	2508	3070.4	TOTAL PAHS FULLND
Pesticides/PCBS (ug/kg)							**Pesticides/PCBS (ug/kg)**
4,4'-DDD	1.6 J	2.9 J	0.75 J	9.2 J	1.1 J	25	4,4'-DDD
4,4'-DDE	1.9 J	3.5	0.61 J	1.9 J	0.45 J	12	4,4'-DDE
4,4'-DDT	7.1 J	8.5 J	1.7 J	2.6 J	0.77 J	15 J	4,4'-DDT
ALDRIN	0.4 UJ	0.4 UJ	0.37 U	0.4 UJ	0.39 UJ	0.36 UJ	ALDRIN
ALPHA-BHC	0.4 U	0.4 U	0.44	0.4 U	0.39 U	0.36 U	ALPHA-BHC
ALPHA-CHLORDANE	0.4 UJ	0.4 UJ	0.37 U	0.4 UJ	0.39 UJ	0.95 J	ALPHA-CHLORDANE
AROCLOR-1016	20.8 U	20.4 U	19.1 U	20.5 U	19.8 U	18.5 U	AROCLOR-1016
AROCLOR-1221	20.8 U	20.4 U	19.1 U	20.5 U	19.8 U	18.5 U	AROCLOR-1221
AROCLOR-1232	20.8 U	20.4 U	19.1 U	20.5 U	19.8 U	18.5 U	AROCLOR-1232
AROCLOR-1242	20.8 U	20.4 U	19.1 U	20.5 U	19.8 U	18.5 U	AROCLOR-1242
AROCLOR-1248	20.8 U	20.4 U	19.1 U	20.5 U	19.8 U	18.5 U	AROCLOR-1248
AROCLOR-1254	20.8 U	20.4 U	19.1 U	20.5 U	19.8 U	18.5 U	AROCLOR-1254
AROCLOR-1260	20.8 UJ	20.4 UJ	19.1 U	20.5 UJ	19.8 UJ	43 J	AROCLOR-1260
BETA-BHC	0.4 U	0.4 U	0.37 U	0.4 UJ	0.39 UJ	0.36 U	BETA-BHC
DELTA-BHC	0.4 UJ	0.4 U	0.37 U	0.65 J	2.4 J	0.36 U	DELTA-BHC
DIELDRIN	0.82 UJ	0.81 UJ	0.75 U	0.81 UJ	0.78 UJ	0.68 J	DIELDRIN
ENDOSULFAN I	0.4 UJ	0.4 UJ	0.37 U	2.8 J	0.39 UJ	0.36 UJ	ENDOSULFAN I
ENDOSULFAN II	0.82 UJ	0.81 UJ	0.75 U	0.81 UJ	0.78 UJ	0.58 J	ENDOSULFAN II
ENDOSULFAN SULFATE	0.82 UJ	0.81 UJ	0.75 U	0.81 UJ	0.78 UJ	0.96 J	ENDOSULFAN SULFATE
ENDRIN	0.82 U	0.81 U	0.75 UJ	0.81 UJ	0.78 UJ	0.73 U	ENDRIN
ENDRIN ALDEHYDE	0.82 U	0.81 UJ	0.75 UJ	2	0.78 U	0.73 UJ	ENDRIN ALDEHYDE
ENDRIN KETONE	0.82 UJ	0.81 UJ	0.75 U	0.81 UJ	0.78 UJ	0.73 UJ	ENDRIN KETONE
GAMMA-BHC (LINDANE)	0.22 J	0.4 U	0.37 U	0.4 U	0.39 U	0.36 U	GAMMA-BHC (LINDANE)
GAMMA-CHLORDANE	0.4 UJ	0.67 J	0.37 U	1.8 J	0.64 J	4.1 J	GAMMA-CHLORDANE
HEPTACHLOR	0.4 UJ	0.4 UJ	0.37 U	0.4 UJ	0.39 UJ	0.36 UJ	HEPTACHLOR
HEPTACHLOR EPOXIDE	0.4 UJ	0.15 J	0.37 U	0.4 UJ	0.39 UJ	0.74	HEPTACHLOR EPOXIDE
METHOXYCHLOR	0.4 UJ	0.4 UJ	0.35 J	15 J	2 J	0.62 J	METHOXYCHLOR
TOXAPHENE	40 U	40 U	37 U	40 U	39 U	36 U	TOXAPHENE

APPENDIX F-1

SUMMARY OF SURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB14-SO-0001	NTC21SB15-SO-0001	NTC21SB16-SO-0001	NTC21SB17-SO-0001	NTC21SB18-SO-0001	NTC21SB19-SO-0001	SAMPLE ID
LOCATION ID	NTC21-SB-14	NTC21-SB-15	NTC21-SB-16	NTC21-SB-17	NTC21-SB-18	NTC21-SB-19	LOCATION ID
SAMPLE DATE	20090927	20090927	20090927	20090926	20090926	20090927	SAMPLE DATE
SAMPLE TIME	09:30:00	10:00:00	17:00:00	13:26:00	12:47:00	17:40:00	SAMPLE TIME
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	SAMPLE CODE
MATRIX	SO	SO	SO	SO	SO	SO	MATRIX
TOP DEPTH	0	0	0	0	0	0	TOP DEPTH
BOTTODEPTH	1	1	1	1	1	1	BOTTODEPTH
DEPTH UNIT	FT	FT	FT	FT	FT	FT	DEPTH UNIT
SUBMATRIX	SS	SS	SS	SS	SS	SS	SUBMATRIX
Herbicides (ug/kg)							**Herbicides (ug/kg)**
2,4,5-T	6.11 UJ	6 U	5.61 U	6.04 U	5.83 U	5.43 U	2,4,5-T
2,4,5-TP (SILVEX)	6.11 U	6 U	5.61 U	6.04 U	5.83 U	5.43 U	2,4,5-TP (SILVEX)
2,4-D	61.1 UJ	60 U	56.1 U	60.4 U	58.3 U	54.3 U	2,4-D
2,4-DB	61.1 UJ	60 U	56.1 U	60.4 U	58.3 U	54.3 U	2,4-DB
DALAPON	153 UJ	150 UJ	140 UJ	151 U	146 U	136 UJ	DALAPON
DICAMBA	9.99 J	6 U	5.61 U	6.04 U	5.83 U	5.43 U	DICAMBA
DICHLOROPROP	61.1 U	60 U	56.1 U	60.4 U	58.3 U	54.3 U	DICHLOROPROP
DINOSEB	17.2 J	30 U	28.1 U	30.2 UJ	29.1 UJ	27.1 U	DINOSEB
MCPA	6110 U	6000 U	5610 U	6040 U	5830 U	5430 U	MCPA
MCPP	6110 U	6000 U	5610 U	6040 U	5830 U	5430 U	MCPP
Dioxins/Furans (ng/kg)							**Dioxins/Furans (ng/kg)**
1,2,3,4,6,7,8,9-OCDD	---	---	---	174	---	---	1,2,3,4,6,7,8,9-OCDD
1,2,3,4,6,7,8,9-OCDF	---	---	---	19.8	---	---	1,2,3,4,6,7,8,9-OCDF
1,2,3,4,6,7,8-HPCDD	---	---	---	17.7	---	---	1,2,3,4,6,7,8-HPCDD
1,2,3,4,6,7,8-HPCDF	---	---	---	9.64	---	---	1,2,3,4,6,7,8-HPCDF
1,2,3,4,7,8,9-HPCDF	---	---	---	0.952 J	---	---	1,2,3,4,7,8,9-HPCDF
1,2,3,4,7,8-HXCDD	---	---	---	5 U	---	---	1,2,3,4,7,8-HXCDD
1,2,3,4,7,8-HXCDF	---	---	---	1.31 J	---	---	1,2,3,4,7,8-HXCDF
1,2,3,6,7,8-HXCDD	---	---	---	1.14 J	---	---	1,2,3,6,7,8-HXCDD
1,2,3,6,7,8-HXCDF	---	---	---	1.07 J	---	---	1,2,3,6,7,8-HXCDF
1,2,3,7,8,9-HXCDD	---	---	---	0.81 J	---	---	1,2,3,7,8,9-HXCDD
1,2,3,7,8,9-HXCDF	---	---	---	0.358 J	---	---	1,2,3,7,8,9-HXCDF
1,2,3,7,8-PECDD	---	---	---	0.76 J	---	---	1,2,3,7,8-PECDD
1,2,3,7,8-PECDF	---	---	---	0.462 U	---	---	1,2,3,7,8-PECDF
2,3,4,6,7,8-HXCDF	---	---	---	1.84 J	---	---	2,3,4,6,7,8-HXCDF
2,3,4,7,8-PECDF	---	---	---	3.66 J	---	---	2,3,4,7,8-PECDF
2,3,7,8-TCDD	---	---	---	0.198 J	---	---	2,3,7,8-TCDD
2,3,7,8-TCDF	---	---	---	0.728 U	---	---	2,3,7,8-TCDF
TOTAL HPCDD	---	---	---	33.9	---	---	TOTAL HPCDD
TOTAL HPCDF	---	---	---	25.2	---	---	TOTAL HPCDF
TOTAL HXCDD	---	---	---	10.6	---	---	TOTAL HXCDD
TOTAL HXCDF	---	---	---	29.8 J	---	---	TOTAL HXCDF
TOTAL PECDD	---	---	---	4.01 J	---	---	TOTAL PECDD
TOTAL PECDF	---	---	---	40.9	---	---	TOTAL PECDF
TOTAL TCDD	---	---	---	1.57	---	---	TOTAL TCDD
TOTAL TCDF	---	---	---	16.2	---	---	TOTAL TCDF
TEQ	---	---	---	3.04986	---	---	TEQ
TEQ FULLND	---	---	---	3.63652	---	---	TEQ FULLND
Inorganics (mg/kg)							**Inorganics (mg/kg)**
ALUMINUM	29500	18400	5180	11400	11800	3030	ALUMINUM
ANTIMONY	1.57 UJ	1.49 UJ	1.31 UJ	0.575 U	0.595 U	0.515 UJ	ANTIMONY
ARSENIC	48.4 J	48.3 J	4.86 J	8.23	7.73	5.95 J	ARSENIC
BARIUM	234 J	164 J	55.9 J	71.6 J	97.7 J	29.3 J	BARIUM
BERYLLIUM	4.71 J	3.69 J	1.04 J	0.836	0.774	0.29 J	BERYLLIUM
CADMIUM	2.63	4.18	0.262 U	0.845	0.621	1.25	CADMIUM
CALCIUM	85900 J	114000 J	113000 J	33600	10700	120000	CALCIUM
CHROMIUM	17.7 J	10.8 J	8.17 J	17.4	17.1	5.38 J	CHROMIUM
COBALT	5.29	9.12	5.51	8.5	11.5	3.55	COBALT
COPPER	50.6 J	45.8 J	17 J	26.4	27.8	16.8 J	COPPER
IRON	47000 J	69500 J	17300 J	27200 J	23500 J	18500 J	IRON
LEAD	67.2 J	31.7 J	29.2 J	29.2	27.2	60.3 J	LEAD

SUMMARY OF SURFAC... ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB14-SO-0001	NTC21SB15-SO-0001	NTC21SB16-SO-0001	NTC21SB17-SO-0001	NTC21SB18-SO-0001	NTC21SB19-SO-0001	SAMPLE ID
LOCATION ID	NTC21-SB-14	NTC21-SB-15	NTC21-SB-16	NTC21-SB-17	NTC21-SB-18	NTC21-SB-19	LOCATION ID
SAMPLE DATE	20090927	20090927	20090927	20090926	20090926	20090927	SAMPLE DATE
SAMPLE TIME	09:30:00	10:00:00	17:00:00	13:26:00	12:47:00	17:40:00	SAMPLE TIME
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	SAMPLE CODE
MATRIX	SO	SO	SO	SO	SO	SO	MATRIX
TOP DEPTH	0	0	0	0	0	0	TOP DEPTH
BOTTODEPTH	1	1	1	1	1	1	BOTTODEPTH
DEPTH UNIT	FT	FT	FT	FT	FT	FT	DEPTH UNIT
SUBMATRIX	SS	SS	SS	SS	SS	SS	SUBMATRIX
Inorganics (mg/kg) (Continued)							**Inorganics (mg/kg) (Continued)**
MAGNESIUM	3940	21500	62900	20400	6180	75800	MAGNESIUM
MANGANESE	2420 J	1250 J	321 J	464	1070	327 J	MANGANESE
MERCURY	0.0618	0.0472	0.0702 J	0.0477	0.0641	0.0374 J	MERCURY
NICKEL	20.1 J	34.6 J	13.2 J	21.7	21.3	9.26 J	NICKEL
POTASSIUM	1930	763	753	1270	1130	571	POTASSIUM
SELENIUM	0.94 UJ	0.892 UJ	1.05 UJ	0.345 U	0.357 U	0.772 UJ	SELENIUM
SILVER	0.313 U	0.297 U	0.262 U	0.115 U	0.119 U	0.103 U	SILVER
SODIUM	1590	1020	1260	2080	1100	1750	SODIUM
THALLIUM	2.82 UJ	0.892 UJ	0.787 UJ	0.345 U	2.08 U	0.309 UJ	THALLIUM
VANADIUM	15.8	15.1	11.5	23.8	21.8	8.94	VANADIUM
ZINC	186 J	352 J	73.6 J	134	111	148 J	ZINC

APPENDIX F-1

SUMMARY OF SURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

NTC21SB20-SO-0001 NTC21-SB-20 20090926 16:57:00 NORMAL SO 0 1 FT SS	NTC21SB21-SO-0001 NTC21-SB-21 20090926 15:10:00 NORMAL SO 0 1 FT SS	NTC21SB22-SO-0001 NTC21-SB-22 20090927 12:00:00 NORMAL SO 0 1 FT SS
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 UJ
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 UJ	5.2 UJ	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	21
0.74 J	5.2 U	6.6 U
8.8 U	10 U	13 U
4.4 U	5.2 U	6.6 U
8.8 U	10 U	13 U
4.4 U	4.2 J	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
8.8 U	10 U	13 U
4.4 U	5.2 U	6.6 U
8.8 U	10 U	13 U
8.8 U	10 U	13 U
4.4 U	5.2 U	6.6 U
0.75 J	0.94 J	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
8.8 U	10 U	13 U
1.1 J	1.2 J	6.6 U
4.4 U	5.2 U	6.6 U
0.97 U	1.1 U	1.9 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
1.1 J	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U
4.4 U	5.2 U	6.6 U

SUMMARY OF SURFA… …ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

NTC21SB20-SO-0001 NTC21-SB-20 20090926 16:57:00 NORMAL SO 0 1 FT SS	NTC21SB21-SO-0001 NTC21-SB-21 20090926 15:10:00 NORMAL SO 0 1 FT SS	NTC21SB22-SO-0001 NTC21-SB-22 20090927 12:00:00 NORMAL SO 0 1 FT SS
350 U	360 U	410 U
710 U	720 U	820 U
350 UR	360 U	410 U
350 UR	360 U	410 U
350 UR	360 U	410 U
710 UR	720 UJ	820 U
3500 UR	3600 U	4100 U
350 U	360 U	410 U
350 U	360 U	410 U
350 U	360 U	410 U
350 UR	360 UJ	410 U
27	260	710
350 U	360 U	410 U
1400 UJ	1400 UJ	1600 U
350 UR	360 U	410 U
350 U	360 U	410 U
1400 U	1400 U	1600 U
1400 UR	1400 UJ	1600 U
350 U	360 U	410 U
350 UR	360 U	410 U
350 U	360 U	410 U
350 U	360 U	410 U
350 UR	50 J	410 U
1400 U	1400 U	1600 U
1400 UR	1400 UJ	1600 U
53	2200	92
3.5 U	89	4.1 U
350 U	360 U	410 U
150	7200	4.1 U
350 U	360 U	410 U
350 U	360 U	410 UR
200 J	22000 J	320
560 J	38000 J	340
620 J	59000 J	710
430 J	24000 J	4.1 U
300 J	21000 J	680
350 U	360 U	410 U
350 U	360 U	410 U
140 J	3400 J	410 UJ
350 UJ	360 UJ	410 UJ
350 U	360 U	410 U
66 J	2400	820 U
280 J	31000 J	460
350 U	360 U	410 U
350 UJ	360 UJ	410 UJ
3.5 UJ	690 J	4.1 U
41 J	640	250 J
350 U	360 U	410 U
350 U	360 U	410 U
830	84000	970
52	1600	4.1 U

APPENDIX F-1

SUMMARY OF SURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

NTC21SB20-SO-0001 NTC21-SB-20 20090926 16:57:00 NORMAL SO 0 1 FT SS	NTC21SB21-SO-0001 NTC21-SB-21 20090926 15:10:00 NORMAL SO 0 1 FT SS	NTC21SB22-SO-0001 NTC21-SB-22 20090927 12:00:00 NORMAL SO 0 1 FT SS
350 U	360 U	410 U
350 U	360 U	410 U
350 UJ	360 UJ	410 U
710 U	720 U	820 U
350 J	36000 J	350
350 U	360 U	410 U
350 UJ	360 UJ	410 U
350 U	360 U	410 U
18	210	300
350 UJ	360 UJ	410 U
1400 UR	1400 U	1600 U
720	30000	1100
350 UR	360 U	410 U
650	70000	890
680.28	50631	485.26
683.78	50631	489.36
5240	427249	6922
5247	427249	6942.5
0.86 J	150 J	230
5.5 J	190	82
1.5 J	390 J	71 J
0.35 UJ	0.35 UJ	0.41 UJ
0.35 U	0.35 U	0.46 J
1.3 J	0.35 UJ	27 J
18.1 U	18.3 U	21 U
18.1 U	18.3 U	21 U
18.1 U	18.3 U	21 U
18.1 U	18.3 U	21 U
18.1 U	18.3 U	21 U
18.1 U	18.3 U	21 U
18.1 UJ	450 J	110 J
0.35 UJ	0.35 UJ	0.41 U
0.35 UJ	0.35 UJ	0.42 J
0.33 J	15 J	1.8 J
0.35 UJ	0.35 UJ	0.41 UJ
0.71 UJ	0.72 UJ	0.83 UJ
0.71 UJ	25 J	3.4 J
1 J	0.72 UJ	2.2 J
0.71 UJ	0.72 UJ	0.83 UJ
3.2 J	44 J	0.83 UJ
0.7 J	20	0.53 J
1.6 J	0.35 UJ	44 J
0.35 UJ	0.35 UJ	0.41 UJ
0.95 J	0.35 UJ	1.5 J
0.35 UJ	0.35 UJ	0.71 J
35 U	35 U	41 U

SUMMARY OF SURFAC[illegible] ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

NTC21SB20-SO-0001	NTC21SB21-SO-0001	NTC21SB22-SO-0001
NTC21-SB-20	NTC21-SB-21	NTC21-SB-22
20090926	20090926	20090927
16:57:00	15:10:00	12:00:00
NORMAL	NORMAL	NORMAL
SO	SO	SO
0	0	0
1	1	1
FT	FT	FT
SS	SS	SS
5.31 U	5.37 U	6.18 U
5.31 U	5.37 U	6.18 U
53.1 U	53.7 U	61.8 U
53.1 U	53.7 U	61.8 U
133 U	134 U	154 UJ
5.31 U	5.37 U	6.18 U
53.1 U	53.7 U	61.8 U
26.6 UJ	26.9 UJ	30.9 U
5310 U	5370 U	6180 U
5310 U	5370 U	6180 U
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—	—	—
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—	—	—
3530	2590	4570
0.553 U	1.6	1.63 UJ
3.12	4.87	6.96 J
33 J	50.5 J	61.3 J
0.254	0.332	0.878 J
0.678	5.25	1.13
133000	130000	97300 J
6.46	9.75	13.6 J
2.51	3.4	3.84
12.9	131	64.7 J
6660 J	16400 J	15300 J
16.7	124	215 J

APPENDIX F-1

SUMMARY OF SURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

NTC21SB20-SO-0001 NTC21-SB-20 20090926 16:57:00 NORMAL SO 0 1 FT SS	NTC21SB21-SO-0001 NTC21-SB-21 20090926 15:10:00 NORMAL SO 0 1 FT SS	NTC21SB22-SO-0001 NTC21-SB-22 20090927 12:00:00 NORMAL SO 0 1 FT SS
70700	75500	43900
332	270	579 J
0.0359	1.07	0.233 J
5.56	32	16.2 J
581	782	493
1.38 U	1.38 U	1.63 UJ
0.111 U	0.233	0.325 U
395	530	933
0.443 U	0.33 U	0.975 UJ
10.8	14.2	18.1
46.5	746	103 J

F-2 SUBSURFACE SOIL ANALYTICAL RESULTS

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB02-SO-0204	NTC21SB02-SO-0406	NTC21SB03-SO-0204	NTC21SB04-SO-0406	NTC21SB05-SO-0204	NTC21SB06-SO-0204	NTC21SB07-SO-0204
LOCATION ID	NTC21-SB-02	NTC21-SB-02	NTC21-SB-03	NTC21-SB-04	NTC21-SB-05	NTC21-SB-06	NTC21-SB-07
SAMPLE DATE	20090928	20091113	20090928	20090927	20090928	20090927	20090927
SAMPLE TIME	10:30:00	09:12:00	12:30:00	13:00:00	10:10:00	15:20:00	10:50:00
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	2	4	2	4	2	2	2
BOTTOM DEPTH	4	6	4	6	4	4	4
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB
Volatile Organics (ug/kg)							
1,1,1-TRICHLOROETHANE	5.8 UJ	1.3 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
1,1,2,2-TETRACHLOROETHANE	5.8 UJ	0.62 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
1,1,2-TRICHLOROETHANE	5.8 UJ	0.51 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
1,1,2-TRICHLOROTRIFLUOROETHANE	5.8 U	0.8 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
1,1-DICHLOROETHANE	5.8 UJ	0.78 UJ	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
1,1-DICHLOROETHENE	5.8 UJ	1.7 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
1,2,4-TRICHLOROBENZENE	5.8 UJ	0.26 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
1,2-DIBROMO-3-CHLOROPROPANE	5.8 UJ	1.7 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
1,2-DIBROMOETHANE	5.8 UJ	0.62 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
1,2-DICHLOROBENZENE	5.8 UJ	0.53 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
1,2-DICHLOROETHANE	5.8 UJ	0.66 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
1,2-DICHLOROPROPANE	5.8 UJ	0.66 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
1,3-DICHLOROBENZENE	5.8 UJ	1.2 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
1,4-DICHLOROBENZENE	5.8 UJ	0.8 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
2-BUTANONE	5.8 U	2 U	5.4 UJ	28 J	4.3 UJ	6.2 UJ	5.1 UJ
2-HEXANONE	5.8 UJ	3.3 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
4-METHYL-2-PENTANONE	5.8 U	0.84 U	5.4 UJ	6.6 U	4.3 UJ	6.2 UJ	5.1 U
ACETONE	5.8 U	35	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
BENZENE	5.8 UJ	0.68 U	5.4 UJ	1.2 J	0.41 J	6.2 UJ	0.71 J
BROMODICHLOROMETHANE	12 UJ	0.43 U	11 UJ	13 U	8.6 U	12 UJ	10 U
BROMOFORM	5.8 UJ	1.4 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
BROMOMETHANE	12 U	1 U	11 UJ	13 U	8.6 U	12 UJ	10 U
CARBON DISULFIDE	5.8 UJ	1.9 J	5.4 UJ	8.1	4.3 U	6.2 UJ	3.1 J
CARBON TETRACHLORIDE	5.8 UJ	1.3 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
CHLOROBENZENE	5.8 UJ	0.49 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
CHLORODIBROMOMETHANE	5.8 UJ	0.49 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
CHLOROETHANE	12 U	1.6 U	11 UJ	13 U	8.6 U	12 UJ	10 U
CHLOROFORM	5.8 UJ	0.8 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
CHLOROMETHANE	12 U	0.75 U	11 UJ	13 U	8.6 U	12 UJ	10 U
CIS-1,2-DICHLOROETHENE	12 UJ	1.7 U	11 UJ	13 U	8.6 U	12 UJ	10 U
CIS-1,3-DICHLOROPROPENE	5.8 UJ	0.72 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
CYCLOHEXANE	1.1 J	0.78 U	1 J	0.74 J	1.7 J	0.9 J	2.2 J
DICHLORODIFLUOROMETHANE	5.8 U	1.6 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
ETHYLBENZENE	5.8 UJ	1.1 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
ISOPROPYLBENZENE	5.8 UJ	1.3 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
METHYL ACETATE	12 U	2.3 UJ	11 UJ	13 U	8.6 U	12 UJ	10 U
METHYL CYCLOHEXANE	1.8 J	1.3 J	1.6 J	1.4 J	3.1 J	2.2 J	4.5 J
METHYL TERT-BUTYL ETHER	5.8 U	0.46 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
METHYLENE CHLORIDE	1.3 U	2.1 U	1.3 U	1.3 U	1.8 U	1.1 U	1.1 U
STYRENE	5.8 UJ	0.51 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
TETRACHLOROETHENE	5.8 UJ	3.3 J	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
TOLUENE	5.8 UJ	1.5 J	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
TOTAL XYLENES	5.8 UJ	1 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
TRANS-1,2-DICHLOROETHENE	5.8 UJ	1.6 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
TRANS-1,3-DICHLOROPROPENE	5.8 UJ	0.46 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
TRICHLOROETHENE	5.8 UJ	1.2 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U
TRICHLOROFLUOROMETHANE	2.8 J	1.4 J	2.8 J	6.6 U	4.3 U	6.2 UJ	5.1 U
VINYL CHLORIDE	5.8 UJ	1.6 U	5.4 UJ	6.6 U	4.3 U	6.2 UJ	5.1 U

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB02-SO-0204	NTC21SB02-SO-0406	NTC21SB03-SO-0204	NTC21SB04-SO-0406	NTC21SB05-SO-0204	NTC21SB06-SO-0204	NTC21SB07-SO-0204
LOCATION ID	NTC21-SB-02	NTC21-SB-02	NTC21-SB-03	NTC21-SB-04	NTC21-SB-05	NTC21-SB-06	NTC21-SB-07
SAMPLE DATE	20090928	20091113	20090928	20090927	20090928	20090927	20090927
SAMPLE TIME	10:30:00	09:12:00	12:30:00	13:00:00	10:10:00	15:20:00	10:50:00
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	2	4	2	4	2	2	2
BOTTOM DEPTH	4	6	4	6	4	4	4
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB
Semivolatile Organics (ug/kg)							
1,1-BIPHENYL	380 U	33 U	360 U	580 U	370 U	440 U	96 J
2,2'-OXYBIS(1-CHLOROPROPANE)	750 U	58 U	720 U	1200 U	740 U	870 U	780 U
2,4,5-TRICHLOROPHENOL	380 UJ	30 U	360 U	580 U	370 U	440 U	390 U
2,4,6-TRICHLOROPHENOL	380 UJ	39 U	360 U	580 U	370 U	440 U	390 U
2,4-DICHLOROPHENOL	380 UJ	21 U	360 U	580 U	370 U	440 U	390 U
2,4-DIMETHYLPHENOL	750 U	24 U	720 U	1200 U	740 U	870 U	780 U
2,4-DINITROPHENOL	3800 UR	150 U	3600 U	5800 U	3700 U	4400 U	3900 U
2,4-DINITROTOLUENE	380 U	27 U	360 U	580 U	370 U	440 U	390 U
2,6-DINITROTOLUENE	380 U	42 U	360 U	580 U	370 U	440 U	390 U
2-CHLORONAPHTHALENE	380 U	36 U	360 U	580 U	370 U	440 U	390 U
2-CHLOROPHENOL	380 U	46 U	360 U	580 U	370 U	440 U	390 U
2-METHYLNAPHTHALENE	1000 J	30	2100	7.5 U	150	500	400
2-METHYLPHENOL	380 U	43 U	360 U	580 U	370 U	440 U	390 U
2-NITROANILINE	1500 UJ	36 U	1400 U	2300 U	1500 U	1700 U	1600 U
2-NITROPHENOL	380 U	25 U	360 U	580 U	370 U	440 U	390 U
3,3'-DICHLOROBENZIDINE	380 UR	35 UJ	360 U	580 U	370 U	440 U	390 U
3-NITROANILINE	1500 UJ	53 U	1400 U	2300 U	1500 U	1700 U	1600 U
4,6-DINITRO-2-METHYLPHENOL	1500 UR	24 U	1400 U	2300 U	1500 U	1700 U	1600 U
4-BROMOPHENYL PHENYL ETHER	380 U	29 U	360 U	580 U	370 U	440 U	390 U
4-CHLORO-3-METHYLPHENOL	380 U	31 U	360 U	580 U	370 U	440 U	390 U
4-CHLOROANILINE	380 U	54 U	360 U	580 U	370 U	440 U	390 U
4-CHLOROPHENYL PHENYL ETHER	380 U	35 U	360 U	580 U	370 U	440 U	390 U
4-METHYLPHENOL	380 U	30 U	360 U	580 U	370 U	440 U	390 U
4-NITROANILINE	1500 UJ	110 UJ	1400 U	2300 U	1500 U	1700 U	1600 U
4-NITROPHENOL	1500 UR	91 U	1400 UJ	2300 U	1500 UJ	1700 U	1600 U
ACENAPHTHENE	110	200	480	5.8 U	33	68	880
ACENAPHTHYLENE	3.8 U	32	2000	25	19	4.4 U	69
ACETOPHENONE	230 J	46 U	360 U	580 U	370 U	440 U	390 U
ANTHRACENE	130	560	5000	8	3.7 U	4.4 U	1400
ATRAZINE	380 UJ	32 U	360 UJ	580 U	370 UJ	440 U	390 U
BENZALDEHYDE	220 J	62 U	360 U	580 UR	370 U	440 UR	390 UR
BENZO(A)ANTHRACENE	280	2000	32000	120	140 J	260	4300
BENZO(A)PYRENE	320	1200	27000	5.8 U	210 J	520	3600
BENZO(B)FLUORANTHENE	450	1600	41000	230	290 J	860	4300
BENZO(G,H,I)PERYLENE	250 J	730	11000	65	130 J	320	1600
BENZO(K)FLUORANTHENE	150	620	14000	220	120 J	840	1700
BIS(2-CHLOROETHOXY)METHANE	380 U	35 U	360 U	580 U	370 U	440 U	390 U
BIS(2-CHLOROETHYL)ETHER	380 U	46 U	360 U	580 U	370 U	440 U	390 U
BIS(2-ETHYLHEXYL)PHTHALATE	230 J	69 J	280 J	580 U	170 J	440 U	390 U
BUTYL BENZYL PHTHALATE	380 UJ	110 J	360 UJ	580 U	370 UJ	440 U	390 U
CAPROLACTAM	380 U	76 U	360 U	580 U	370 U	440 U	390 U
CARBAZOLE	750 U	430 J	720 U	1200 U	740 U	870 U	1000
CHRYSENE	290	2100	34000	100	170 J	360	4900
DI-N-BUTYL PHTHALATE	380 UJ	34 U	360 UJ	580 U	370 UJ	440 U	390 U
DI-N-OCTYL PHTHALATE	380 UJ	30 U	360 UJ	580 U	370 UJ	440 UJ	390 UJ
DIBENZO(A,H)ANTHRACENE	66 J	240	3300	5.8 U	38 J	4.4 U	3.9 U
DIBENZOFURAN	310 J	150 J	490	580 U	66 J	180 J	670
DIETHYL PHTHALATE	380 U	38 U	360 U	580 U	370 U	440 U	390 U
DIMETHYL PHTHALATE	380 U	34 U	360 U	580 U	370 U	440 U	390 U
FLUORANTHENE	650	4700	56000	200	360	930	13000
FLUORENE	3.8 U	180	90 U	5.8 U	3.7 U	4.4 U	1200

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB02-SO-0204	NTC21SB02-SO-0406	NTC21SB03-SO-0204	NTC21SB04-SO-0406	NTC21SB05-SO-0204	NTC21SB06-SO-0204	NTC21SB07-SO-0204
LOCATION ID	NTC21-SB-02	NTC21-SB-02	NTC21-SB-03	NTC21-SB-04	NTC21-SB-05	NTC21-SB-06	NTC21-SB-07
SAMPLE DATE	20090928	20091113	20090928	20090927	20090928	20090927	20090927
SAMPLE TIME	10:30:00	09:12:00	12:30:00	13:00:00	10:10:00	15:20:00	10:50:00
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	2	4	2	4	2	2	2
BOTTOM DEPTH	4	6	4	6	4	4	4
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB
Semivolatile Organics (ug/kg) (Continued)							
HEXACHLOROBENZENE	380 U	39 U	360 U	580 U	370 U	440 U	390 U
HEXACHLOROBUTADIENE	380 U	37 U	360 U	580 U	370 U	440 U	390 U
HEXACHLOROCYCLOPENTADIENE	380 UJ	69 U	360 U	580 U	370 U	440 U	390 U
HEXACHLOROETHANE	750 U	44 U	720 U	1200 U	740 U	870 U	780 U
INDENO(1,2,3-CD)PYRENE	330 J	890	16000	5.8 U	200 J	420	2500
ISOPHORONE	380 U	32 U	360 U	580 U	370 U	440 U	390 U
N-NITROSO-DI-N-PROPYLAMINE	380 U	62 U	360 U	580 U	370 U	440 U	390 U
N-NITROSODIPHENYLAMINE	380 U	36 U	360 U	580 U	370 U	440 U	390 U
NAPHTHALENE	470	33	1100	10	58	230	550
NITROBENZENE	380 U	39 U	360 U	580 U	370 U	440 U	390 U
PENTACHLOROPHENOL	1500 UJ	38 U	1400 U	2300 U	1500 U	1700 U	1600 U
PHENANTHRENE	1100	2200	11000	34	380	970	11000
PHENOL	380 U	40 U	360 U	580 U	370 U	440 U	390 U
PYRENE	540	3200	52000	200	320	760	10000
BAP EQUIVALENT	493.79	1897.3	39374	37.3	312.37	682.76	4731.9
BAP EQUIVALENT FULLND	493.79	1897.3	39374	49.48	312.37	687.16	4735.8
TOTAL PAHS	6136	20515	307980	1212	2618	7038	61399
TOTAL PAHS FULLND	6143.6	20515	308070	1248.5	2625.4	7055.6	61402.9
Pesticides/PCBS (ug/kg)							
4,4'-DDD	7.9 J	0.19 U	11 J	1.2 U	30 J	480	0.78 U
4,4'-DDE	8.2	17.3 J	15	1.2 U	22	300	0.78 U
4,4'-DDT	8 J	8.53 J	16 J	1.2 UJ	14 J	240 J	0.78 UJ
ALDRIN	0.37 UJ	0.83 J	0.36 UJ	0.571 U	0.36 UJ	0.43 UJ	0.38 U
ALPHA-BHC	2.8 J	0.12 UJ	0.37 J	0.571 U	0.36 U	0.64 J	0.38 U
ALPHA-CHLORDANE	0.37 UJ	0.41 J	0.36 UJ	0.571 U	0.62 J	9.9 J	0.38 U
AROCLOR-1016	19.2 U	4.72 UJ	18.4 U	29.4 U	18.7 U	22.2 U	19.8 U
AROCLOR-1221	19.2 U	4.72 U	18.4 U	29.4 U	18.7 U	22.2 U	19.8 U
AROCLOR-1232	19.2 U	4.72 U	18.4 U	29.4 U	18.7 U	22.2 U	19.8 U
AROCLOR-1242	19.2 U	47 J	18.4 U	29.4 U	18.7 U	22.2 U	19.8 U
AROCLOR-1248	19.2 U	4.72 U	18.4 U	29.4 U	18.7 U	22.2 U	19.8 U
AROCLOR-1254	19.2 U	4.72 U	18.4 U	29.4 U	18.7 U	22.2 U	19.8 U
AROCLOR-1260	69 J	122 J	29 J	29.4 U	130 J	440 J	19.8 U
BETA-BHC	0.37 UJ	0.12 U	0.36 U	0.571 U	0.36 U	0.57 J	0.38 U
DELTA-BHC	0.37 U	1.48 J	0.36 U	0.571 U	0.36 U	3	0.38 U
DIELDRIN	0.87 J	2.89 J	1.1 J	1.2 U	1.6 J	5.6 J	0.78 U
ENDOSULFAN I	0.37 UJ	3.22 J	0.36 UJ	0.571 U	0.36 UJ	0.43 UJ	0.38 U
ENDOSULFAN II	0.59 J	1.26	0.19 J	1.2 U	1.1 J	0.88 UJ	0.78 U
ENDOSULFAN SULFATE	1.3 J	3.91	0.72 J	1.2 U	0.65 J	8.7 J	0.78 U
ENDRIN	0.82 J	1.84 J	0.73 UJ	1.2 UJ	1.5 J	0.88 U	0.78 UJ
ENDRIN ALDEHYDE	0.76 UJ	0.19 U	0.73 UJ	1.2 UJ	0.739 UJ	0.88 UJ	0.78 UJ
ENDRIN KETONE	0.76 UJ	0.19 U	1.5 J	1.2 U	0.739 UJ	0.88 UJ	0.78 U
GAMMA-BHC (LINDANE)	0.37 U	0.46	0.33 J	0.571 U	0.36 U	2.3 J	0.38 U
GAMMA-CHLORDANE	3.5 J	1.07 J	2.4 J	0.571 U	3.9 J	4.5 J	0.38 U
HEPTACHLOR	0.37 UJ	0.12 UJ	0.36 UJ	0.571 U	0.36 UJ	0.43 UJ	0.38 U
HEPTACHLOR EPOXIDE	0.9 J	0.12 U	0.39 J	0.571 U	0.53 J	6.3	0.38 U
METHOXYCHLOR	1.2 J	34.2 J	4.3 J	0.571 UJ	2.8 J	11 J	2.7 J
TOXAPHENE	37 U	12.4 U	36 U	57 U	36 U	43 U	38 U
Herbicides (ug/kg)							
2,4,5-T	5.63 U	2.81 U	5.42 U	8.66 UJ	5.51 U	6.53 UJ	5.81 UJ
2,4,5-TP (SILVEX)	5.63 U	2.81 U	5.42 U	8.66 U	5.51 U	6.53 U	5.81 U
2,4-D	56.3 U	28.1 U	54.2 U	86.6 UJ	55.1 U	54.6 J	58.1 UJ

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB02-SO-0204	NTC21SB02-SO-0406	NTC21SB03-SO-0204	NTC21SB04-SO-0406	NTC21SB05-SO-0204	NTC21SB06-SO-0204	NTC21SB07-SO-0204
LOCATION ID	NTC21-SB-02	NTC21-SB-02	NTC21-SB-03	NTC21-SB-04	NTC21-SB-05	NTC21-SB-06	NTC21-SB-07
SAMPLE DATE	20090928	20091113	20090928	20090927	20090928	20090927	20090927
SAMPLE TIME	10:30:00	09:12:00	12:30:00	13:00:00	10:10:00	15:20:00	10:50:00
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	2	4	2	4	2	2	2
BOTTOM DEPTH	4	6	4	6	4	4	4
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB
Herbicides (ug/kg) (Continued)							
2,4-DB	56.3 UJ	28.1 U	54.2 UJ	86.6 UJ	55.1 UJ	65.3 UJ	58.1 UJ
DALAPON	141 UJ	70.3 U	136 UJ	216 UJ	138 UJ	163 UJ	145 UJ
DICAMBA	6.89 J	2.81 U	6.81 J	8.66 U	5.51 U	6.13 J	5.81 U
DICHLOROPROP	56.3 U	28.1 U	54.2 U	86.6 U	55.1 U	65.3 U	58.1 U
DINOSEB	28.2 U	14.1 U	27.1 U	43.3 U	27.6 U	32.7 U	29.1 U
MCPA	5630 U	2810 U	5420 U	8660 U	5510 U	6530 U	5810 U
MCPP	5630 U	2810 U	5420 U	8660 U	5510 U	6530 U	5810 U
Dioxins/Furans (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	1950	---	---	---	---	---	---
1,2,3,4,6,7,8,9-OCDF	44.8	---	---	---	---	---	---
1,2,3,4,6,7,8-HPCDD	167	---	---	---	---	---	---
1,2,3,4,6,7,8-HPCDF	18.1	---	---	---	---	---	---
1,2,3,4,7,8,9-HPCDF	1.74 J	---	---	---	---	---	---
1,2,3,4,7,8-HXCDD	1.04 J	---	---	---	---	---	---
1,2,3,4,7,8-HXCDF	2.56 J	---	---	---	---	---	---
1,2,3,6,7,8-HXCDD	3.62 J	---	---	---	---	---	---
1,2,3,6,7,8-HXCDF	1.39 J	---	---	---	---	---	---
1,2,3,7,8,9-HXCDD	2.42 J	---	---	---	---	---	---
1,2,3,7,8,9-HXCDF	0.682 J	---	---	---	---	---	---
1,2,3,7,8-PECDD	0.579 J	---	---	---	---	---	---
1,2,3,7,8-PECDF	0.521 U	---	---	---	---	---	---
2,3,4,6,7,8-HXCDF	2.14 J	---	---	---	---	---	---
2,3,4,7,8-PECDF	2.75 J	---	---	---	---	---	---
2,3,7,8-TCDD	0.279 J	---	---	---	---	---	---
2,3,7,8-TCDF	0.742 U	---	---	---	---	---	---
TOTAL HPCDD	335	---	---	---	---	---	---
TOTAL HPCDF	61.3	---	---	---	---	---	---
TOTAL HXCDD	29.8	---	---	---	---	---	---
TOTAL HXCDF	40.4	---	---	---	---	---	---
TOTAL PECDD	4.76 J	---	---	---	---	---	---
TOTAL PECDF	32.5	---	---	---	---	---	---
TOTAL TCDD	2.93	---	---	---	---	---	---
TOTAL TCDF	12.6	---	---	---	---	---	---
TEQ	5.53504	---	---	---	---	---	---
TEQ FULLND	5.62487	---	---	---	---	---	---
Inorganics (mg/kg)							
ALUMINUM	4590	5090	4830	13200	7820	4450	6830
ANTIMONY	1.42 UJ	0.27 U	1.36 UJ	0.892 UJ	0.54 U	1.62 U	0.556 UJ
ARSENIC	8.57	4.16	10.4	14.6 J	7.32	6.39	8.88 J
BARIUM	42.6 J	48.8	44.6 J	115 J	48 J	55.3 J	44.9 J
BERYLLIUM	0.985	0.28	0.694	1.26 J	0.604	0.603	0.397 J
CADMIUM	0.283 U	0.74 U	0.395	2.49	0.449	1.51	0.606
CALCIUM	86600 J	177000	109000 J	36100 J	50200	133000	24900 J
CHROMIUM	10.1	7.97	10.8	34.3 J	14.2	16.5	10.9 J
COBALT	3.18	2.25	4.52	15.8	8.23	3.59	6.25
COPPER	23.8 J	9.91	34.4 J	72.6 J	31.7	77.1	124 J
IRON	15000 J	6560	18600 J	30500 J	20700 J	15100 J	26600 J
LEAD	35.6 J	10.8	63.2 J	184 J	37 J	100 J	228 J
MAGNESIUM	36700	81500	58300	15800	24100	57900	14600
MANGANESE	294	270	413	267 J	419	354	465 J
MERCURY	0.0963 J	0.03	0.215 J	0.0897	0.0375 J	0.237	0.0778

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB02-SO-0204	NTC21SB02-SO-0406	NTC21SB03-SO-0204	NTC21SB04-SO-0406	NTC21SB05-SO-0204	NTC21SB06-SO-0204	NTC21SB07-SO-0204
LOCATION ID	NTC21-SB-02	NTC21-SB-02	NTC21-SB-03	NTC21-SB-04	NTC21-SB-05	NTC21-SB-06	NTC21-SB-07
SAMPLE DATE	20090928	20091113	20090928	20090927	20090928	20090927	20090927
SAMPLE TIME	10:30:00	09:12:00	12:30:00	13:00:00	10:10:00	15:20:00	10:50:00
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	2	4	2	4	2	2	2
BOTTOM DEPTH	4	6	4	6	4	4	4
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB
Inorganics (mg/kg) (Continued)							
NICKEL	10.2	4.42	13.4	34 J	22.5	13.1	14.6 J
POTASSIUM	658 J	603	785 J	1320	956	746	558
SELENIUM	0.849 UJ	1.65 U	0.818 UJ	0.535 UJ	0.54 UJ	1.29 UJ	0.334 UJ
SILVER	0.283 U	0.05 U	0.273 U	0.178 U	0.108 U	0.323 U	0.111 U
SODIUM	817	289	1590	1460	922	792	427
THALLIUM	0.849 U	0.16 U	0.818 U	0.535 UJ	0.432 U	0.97 U	0.445 UJ
VANADIUM	12.8	10.5	15.2	33.5	16.8 J	15.4 J	17.4
ZINC	110 J	38.5	115 J	1010 J	90.6 J	151 J	181 J
Miscellaneous Parameters (%)							
PERCENT CLAY	—	—	—	—	—	—	—
PERCENT GRAVEL	—	—	—	—	—	—	—
PERCENT SAND	—	—	—	—	—	—	—
PERCENT SILT	—	—	—	—	—	—	—
SIEVE 1"	—	—	—	—	—	—	—
SIEVE 1/2"	—	—	—	—	—	—	—
SIEVE 3/4"	—	—	—	—	—	—	—
SIEVE NO. 004	—	—	—	—	—	—	—
SIEVE NO. 010	—	—	—	—	—	—	—
SIEVE NO. 040	—	—	—	—	—	—	—
SIEVE NO. 100	—	—	—	—	—	—	—
SIEVE NO. 200	—	—	—	—	—	—	—

APPENDIX F-2

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB08-SO-0204	NTC21SB09-SO-0204	NTC21SB10-SO-0406	NTC21SB11-SO-0204	NTC21SB12-SO-0204	NTC21SB13-SO-0204	NTC21SB14-SO-0204
LOCATION ID	NTC21-SB-08	NTC21-SB-09	NTC21-SB-10	NTC21-SB-11	NTC21-SB-12	NTC21-SB-13	NTC21-SB-14
SAMPLE DATE	20090928	20090926	20090926	20090926	20090926	20090927	20090927
SAMPLE TIME	12:00:00	16:28:00	18:40:00	18:12:00	14:10:00	09:10:00	09:40:00
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	2	2	4	2	2	2	2
BOTTOM DEPTH	4	4	6	4	4	4	4
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB
Volatile Organics (ug/kg)							
1,1,1-TRICHLOROETHANE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
1,1,2,2-TETRACHLOROETHANE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
1,1,2-TRICHLOROETHANE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
1,1,2-TRICHLOROTRIFLUOROETHANE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
1,1-DICHLOROETHANE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 UJ	6.7 UJ
1,1-DICHLOROETHENE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
1,2,4-TRICHLOROBENZENE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
1,2-DIBROMO-3-CHLOROPROPANE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
1,2-DIBROMOETHANE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
1,2-DICHLOROBENZENE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
1,2-DICHLOROETHANE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
1,2-DICHLOROPROPANE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
1,3-DICHLOROBENZENE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
1,4-DICHLOROBENZENE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
2-BUTANONE	6.8 UJ	9 J	4.9 UJ	5.6 UJ	7.7 UJ	4.2 U	11
2-HEXANONE	6.8 U	4.7 UJ	4.9 UJ	5.6 UJ	7.7 UJ	4.2 U	6.7 U
4-METHYL-2-PENTANONE	6.8 UJ	4.7 UJ	4.9 UJ	5.6 UJ	7.7 UJ	4.2 U	6.7 U
ACETONE	6.8 U	4.7 UJ	4.9 UJ	5.6 UJ	7.7 UJ	4.2 U	58
BENZENE	2.6 J	4.7 U	1.2 J	5.6 U	7.7 U	1.6 J	6.7 U
BROMODICHLOROMETHANE	14 U	9.4 U	9.8 U	11 U	15 U	8.4 U	13 U
BROMOFORM	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
BROMOMETHANE	14 U	9.4 U	9.8 U	11 U	15 U	8.4 U	13 U
CARBON DISULFIDE	6.8 U	4.2 J	1.3 J	4.6 J	2 J	6.3	3.2 J
CARBON TETRACHLORIDE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
CHLOROBENZENE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
CHLORODIBROMOMETHANE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
CHLOROETHANE	14 U	9.4 U	9.8 U	11 U	15 U	8.4 U	13 U
CHLOROFORM	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
CHLOROMETHANE	14 U	9.4 U	9.8 U	11 U	15 U	8.4 U	13 U
CIS-1,2-DICHLOROETHENE	14 U	9.4 U	1.5 J	11 U	15 U	8.4 U	13 U
CIS-1,3-DICHLOROPROPENE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
CYCLOHEXANE	3.8 J	0.62 J	3 J	1 J	2.6 J	2.5 J	6.7 U
DICHLORODIFLUOROMETHANE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
ETHYLBENZENE	1.3 J	4.7 U	4.9 U	5.6 U	7.7 U	0.7 J	6.7 U
ISOPROPYLBENZENE	6.8 U	0.97 J	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
METHYL ACETATE	14 U	9.4 U	9.8 U	11 U	15 U	8.4 U	13 U
METHYL CYCLOHEXANE	7.1	1.2 J	5	1.5 J	4.8 J	4.6	6.7 U
METHYL TERT-BUTYL ETHER	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
METHYLENE CHLORIDE	3.3 U	1.8 U	1.8 U	1.9 U	2.6 U	0.86 U	1.7 U
STYRENE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
TETRACHLOROETHENE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
TOLUENE	4.3 J	4.7 U	1.6 J	5.6 U	7.7 U	2.7 J	6.7 U
TOTAL XYLENES	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
TRANS-1,2-DICHLOROETHENE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
TRANS-1,3-DICHLOROPROPENE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
TRICHLOROETHENE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
TRICHLOROFLUOROMETHANE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U
VINYL CHLORIDE	6.8 U	4.7 U	4.9 U	5.6 U	7.7 U	4.2 U	6.7 U

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB08-SO-0204	NTC21SB09-SO-0204	NTC21SB10-SO-0406	NTC21SB11-SO-0204	NTC21SB12-SO-0204	NTC21SB13-SO-0204	NTC21SB14-SO-0204
LOCATION ID	NTC21-SB-08	NTC21-SB-09	NTC21-SB-10	NTC21-SB-11	NTC21-SB-12	NTC21-SB-13	NTC21-SB-14
SAMPLE DATE	20090928	20090926	20090926	20090926	20090926	20090927	20090927
SAMPLE TIME	12:00:00	16:28:00	18:40:00	18:12:00	14:10:00	09:10:00	09:40:00
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	2	2	4	2	2	2	2
BOTTOM DEPTH	4	4	6	4	4	4	4
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB
Semivolatile Organics (ug/kg)							
1,1-BIPHENYL	450 U	420 U	400 U	400 U	430 U	400 U	440 U
2,2'-OXYBIS(1-CHLOROPROPANE)	900 U	840 U	800 U	790 U	860 U	790 U	880 U
2,4,5-TRICHLOROPHENOL	450 U	420 U	400 U	400 U	430 U	400 U	440 U
2,4,6-TRICHLOROPHENOL	450 U	420 U	400 U	400 U	430 U	400 U	440 U
2,4-DICHLOROPHENOL	450 U	420 U	400 U	400 U	430 U	400 U	440 U
2,4-DIMETHYLPHENOL	900 U	840 UJ	800 UJ	790 UJ	860 UJ	790 U	880 U
2,4-DINITROPHENOL	4500 U	4200 U	4000 U	4000 U	4300 U	4000 U	4400 U
2,4-DINITROTOLUENE	450 U	420 U	400 U	400 U	430 U	400 U	440 U
2,6-DINITROTOLUENE	450 U	420 U	400 U	400 U	430 U	400 U	440 U
2-CHLORONAPHTHALENE	450 U	420 U	400 U	400 U	430 U	400 U	440 U
2-CHLOROPHENOL	450 U	420 U	400 U	400 UJ	430 UJ	400 U	440 U
2-METHYLNAPHTHALENE	84	22	8.8	240	480	4 U	4.4 U
2-METHYLPHENOL	450 U	420 U	400 U	400 U	430 U	400 U	440 U
2-NITROANILINE	1800 U	1700 UJ	1600 UJ	1600 UJ	1700 UJ	1600 U	1800 U
2-NITROPHENOL	450 U	420 U	400 U	400 U	430 U	400 U	440 U
3,3'-DICHLOROBENZIDINE	450 U	420 U	400 U	400 U	430 U	400 U	440 U
3-NITROANILINE	1800 U	1700 U	1600 U	1600 U	1700 U	1600 U	1800 U
4,6-DINITRO-2-METHYLPHENOL	1800 U	1700 U	1600 U	1600 UJ	1700 UJ	1600 U	1800 U
4-BROMOPHENYL PHENYL ETHER	450 U	420 U	400 U	400 U	430 U	400 U	440 U
4-CHLORO-3-METHYLPHENOL	450 U	420 U	400 U	400 U	430 U	400 U	440 U
4-CHLOROANILINE	450 U	420 U	400 U	400 U	430 U	400 U	440 U
4-CHLOROPHENYL PHENYL ETHER	450 U	420 U	400 U	400 U	430 U	400 U	440 U
4-METHYLPHENOL	450 U	420 U	400 U	400 U	430 U	400 U	440 U
4-NITROANILINE	1800 U	1700 U	1600 U	1600 U	1700 U	1600 U	1800 U
4-NITROPHENOL	1800 UJ	1700 UJ	1600 UJ	1600 UJ	1700 UJ	1600 U	1800 U
ACENAPHTHENE	38	38	12	57	4.3 U	4 U	4.4 U
ACENAPHTHYLENE	88	16	2.8 J	19	170	4 U	4.4 U
ACETOPHENONE	450 U	420 U	400 U	400 U	430 U	400 U	440 U
ANTHRACENE	150	110	16	76	220	4 U	4.4 U
ATRAZINE	450 UJ	420 UJ	400 UJ	400 U	430 U	400 U	440 U
BENZALDEHYDE	450 U	420 U	400 U	400 U	430 U	400 UR	440 UR
BENZO(A)ANTHRACENE	430 J	81 J	16	150 J	420 J	14	4.4 U
BENZO(A)PYRENE	740 J	170 J	33	220 J	620 J	4 U	4.4 U
BENZO(B)FLUORANTHENE	1200 J	280 J	52	380 J	1200 J	6.4	4.4 U
BENZO(G,H,I)PERYLENE	470 J	100 J	23	120 J	330 J	4 U	4.4 U
BENZO(K)FLUORANTHENE	460 J	92 J	17	88 J	380 J	7.2	4.4 U
BIS(2-CHLOROETHOXY)METHANE	450 U	420 U	400 U	400 U	430 U	400 U	440 U
BIS(2-CHLOROETHYL)ETHER	450 U	420 U	400 U	400 U	430 U	400 U	440 U
BIS(2-ETHYLHEXYL)PHTHALATE	280 J	420 U	400 U	400 U	430 U	400 U	440 U
BUTYL BENZYL PHTHALATE	450 UJ	420 U	400 U	400 UJ	430 UJ	400 U	440 U
CAPROLACTAM	450 U	420 U	400 U	400 U	430 U	400 U	440 U
CARBAZOLE	900 U	840 U	800 U	790 U	860 U	790 U	880 U
CHRYSENE	580 J	120 J	23	160 J	530 J	8	4.4 U
DI-N-BUTYL PHTHALATE	450 UJ	420 U	400 U	400 U	430 U	400 U	440 U
DI-N-OCTYL PHTHALATE	450 UJ	420 U	400 U	400 UJ	430 UJ	400 U	440 U
DIBENZO(A,H)ANTHRACENE	160 J	28 J	4 UJ	34 J	100 J	4 U	4.4 U
DIBENZOFURAN	36 J	420 U	400 U	74 J	330 J	400 U	440 U
DIETHYL PHTHALATE	450 U	420 U	400 U	400 U	430 U	400 U	440 U
DIMETHYL PHTHALATE	450 U	420 U	400 U	400 U	430 U	400 U	440 U
FLUORANTHENE	1100	450	78	520	1400	15	1.9 U
FLUORENE	57	68	16	4 U	4.3 U	4 U	4.4 U

APPENDIX F-2

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB08-SO-0204	NTC21SB09-SO-0204	NTC21SB10-SO-0406	NTC21SB11-SO-0204	NTC21SB12-SO-0204	NTC21SB13-SO-0204	NTC21SB14-SO-0204
LOCATION ID	NTC21-SB-08	NTC21-SB-09	NTC21-SB-10	NTC21-SB-11	NTC21-SB-12	NTC21-SB-13	NTC21-SB-14
SAMPLE DATE	20090928	20090926	20090926	20090926	20090926	20090927	20090927
SAMPLE TIME	12:00:00	16:28:00	18:40:00	18:12:00	14:10:00	09:10:00	09:40:00
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	2	2	4	2	2	2	2
BOTTOM DEPTH	4	4	6	4	4	4	4
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB
Semivolatile Organics (ug/kg) (Continued)							
HEXACHLOROBENZENE	450 U	420 U	400 U	400 U	430 U	400 U	440 U
HEXACHLOROBUTADIENE	450 U	420 U	400 U	400 U	430 U	400 U	440 U
HEXACHLOROCYCLOPENTADIENE	450 U	420 U	400 U	400 UJ	430 UJ	400 U	440 U
HEXACHLOROETHANE	900 U	840 U	800 U	790 U	860 U	790 U	880 U
INDENO(1,2,3-CD)PYRENE	690 J	160 J	28	150 J	470 J	4 U	4.4 U
ISOPHORONE	450 U	420 U	400 U	400 U	430 U	400 U	440 U
N-NITROSO-DI-N-PROPYLAMINE	450 U	420 UJ	400 UJ	400 UJ	430 UJ	400 U	440 U
N-NITROSODIPHENYLAMINE	450 U	420 U	400 U	400 U	430 U	400 U	440 U
NAPHTHALENE	43	180	8.9	1700	440	4 U	4.4 U
NITROBENZENE	450 U	420 UJ	400 UJ	400 UJ	430 UJ	400 U	440 U
PENTACHLOROPHENOL	1800 U	1700 U	1600 U	1600 U	1700 U	1600 U	1800 U
PHENANTHRENE	560	290	67	470	2100	19	4.4 U
PHENOL	450 U	420 U	400 U	400 U	430 U	400 U	440 U
PYRENE	950	340	63	420	1000	14	4.4 U
BAP EQUIVALENT	1137.18	251.14	42.793	323.04	933.33	2.12	0 U
BAP EQUIVALENT FULLND	1137.18	251.14	46.793	323.04	933.33	10.52	10.1684
TOTAL PAHS	7800	2545	464.5	4804	9860	83.6	0 U
TOTAL PAHS FULLND	7800	2545	468.5	4808	9868.6	123.6	72.3
Pesticides/PCBS (ug/kg)							
4,4'-DDD	31 J	0.37 J	1.7 J	190	0.87 U	0.79 U	0.89 U
4,4'-DDE	20	0.84 UJ	0.69 J	35 J	1.7 J	0.79 U	0.89 U
4,4'-DDT	31 J	0.84 UJ	1.9 J	18 J	1.2 J	0.79 UJ	0.89 UJ
ALDRIN	0.45 UJ	0.42 UJ	0.4 UJ	0.39 UJ	0.43 UJ	0.39 U	0.44 U
ALPHA-BHC	0.45 U	0.42 U	0.71 J	0.39 U	0.43 U	0.39 U	0.44 U
ALPHA-CHLORDANE	2 J	0.42 UJ	0.73 J	17 J	0.43 UJ	0.39 U	0.44 U
AROCLOR-1016	23.1 U	21.4 U	20.5 U	20.2 U	22.1 U	20.2 U	22.6 U
AROCLOR-1221	23.1 U	21.4 U	20.5 U	20.2 U	22.1 U	20.2 U	22.6 U
AROCLOR-1232	23.1 U	21.4 U	20.5 U	20.2 U	22.1 U	20.2 U	22.6 U
AROCLOR-1242	23.1 U	21.4 U	20.5 U	20.2 U	22.1 U	20.2 U	22.6 U
AROCLOR-1248	23.1 U	21.4 U	20.5 U	20.2 U	22.1 U	20.2 U	22.6 U
AROCLOR-1254	23.1 U	21.4 U	20.5 U	20.2 U	22.1 U	20.2 U	22.6 U
AROCLOR-1260	120 J	21.4 UJ	20.5 UJ	72 J	22.1 UJ	20.2 U	22.6 U
BETA-BHC	0.45 U	0.42 UJ	1.1 J	0.39 UJ	0.43 UJ	0.39 U	0.44 U
DELTA-BHC	0.45 U	0.42 UJ	0.52 J	0.39 UJ	0.34 J	0.39 U	0.44 U
DIELDRIN	1.1 J	0.84 UJ	0.81 UJ	1.7 J	0.87 UJ	0.79 U	0.89 U
ENDOSULFAN I	0.45 UJ	0.42 UJ	0.96 J	0.39 UJ	1.3 J	0.39 U	0.44 U
ENDOSULFAN II	1.2 J	0.84 UJ	0.81 UJ	0.8 UJ	0.87 UJ	0.79 U	0.89 U
ENDOSULFAN SULFATE	0.73 J	0.84 UJ	0.81 UJ	3.1 J	0.87 UJ	0.79 U	0.89 U
ENDRIN	1.3 J	0.84 U	0.81 U	3.2 J	0.87 UJ	0.79 UJ	0.89 UJ
ENDRIN ALDEHYDE	0.91 UJ	0.84 UJ	4.9 J	0.8 UJ	1.1 J	0.79 UJ	0.89 UJ
ENDRIN KETONE	0.91 UJ	0.84 UJ	0.81 UJ	0.8 UJ	0.87 UJ	0.79 U	0.89 U
GAMMA-BHC (LINDANE)	0.45 U	0.42 U	0.42 J	0.39 U	0.43 U	0.39 U	0.44 U
GAMMA-CHLORDANE	4.2 J	0.15 J	1.7 J	19 J	1.1 J	0.39 U	0.44 U
HEPTACHLOR	0.45 UJ	0.42 UJ	0.4 UJ	0.39 UJ	0.43 UJ	0.39 U	0.44 U
HEPTACHLOR EPOXIDE	1.4 J	0.42 UJ	0.4 UJ	0.39 UJ	0.43 UJ	0.39 U	0.44 U
METHOXYCHLOR	3.7 J	0.8 J	0.4 UJ	0.39 UJ	8.9 J	0.39 UJ	0.44 UJ
TOXAPHENE	45 U	42 U	40 U	39 U	43 U	39 U	44 U
Herbicides (ug/kg)							
2,4,5-T	6.78 U	6.29 UJ	6.04 UJ	5.94 UJ	6.49 U	5.93 UJ	6.64 UJ
2,4,5-TP (SILVEX)	6.78 U	2.63 U	6.04 U	5.94 U	6.49 U	5.93 U	6.64 U
[illegible]D	67.8 U	62.9 U	60.4 [illegible]	59.4 U	64.9 U	59.3 UJ	66.4 UJ

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB08-SO-0204	NTC21SB09-SO-0204	NTC21SB10-SO-0406	NTC21SB11-SO-0204	NTC21SB12-SO-0204	NTC21SB13-SO-0204	NTC21SB14-SO-0204
LOCATION ID	NTC21-SB-08	NTC21-SB-09	NTC21-SB-10	NTC21-SB-11	NTC21-SB-12	NTC21-SB-13	NTC21-SB-14
SAMPLE DATE	20090928	20090926	20090926	20090926	20090926	20090927	20090927
SAMPLE TIME	12:00:00	16:28:00	18:40:00	18:12:00	14:10:00	09:10:00	09:40:00
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	2	2	4	2	2	2	2
BOTTOM DEPTH	4	4	6	4	4	4	4
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB
Herbicides (ug/kg) (Continued)							
2,4-DB	67.8 UJ	62.9 U	60.4 U	59.4 U	64.9 U	59.3 UJ	66.4 UJ
DALAPON	170 UJ	157 UJ	151 U	149 U	162 U	148 UJ	166 UJ
DICAMBA	6.78 U	6.29 UJ	6.04 U	5.94 U	6.49 U	5.93 U	8.28 J
DICHLOROPROP	67.8 U	62.9 U	60.4 U	59.4 U	64.9 U	59.3 U	66.4 U
DINOSEB	33.9 U	31.5 UJ	30.2 U	29.7 U	32.5 UJ	29.6 U	33.2 U
MCPA	6780 U	6290 U	6040 UJ	5940 UJ	6490 U	5930 U	6640 U
MCPP	6780 U	6290 U	6040 U	5940 U	6490 U	5930 U	6640 U
Dioxins/Furans (ng/kg)							
1,2,3,4,6,7,8,9-OCDD	—	—	—	—	—	—	—
1,2,3,4,6,7,8,9-OCDF	—	—	—	—	—	—	—
1,2,3,4,6,7,8-HPCDD	—	—	—	—	—	—	—
1,2,3,4,6,7,8-HPCDF	—	—	—	—	—	—	—
1,2,3,4,7,8,9-HPCDF	—	—	—	—	—	—	—
1,2,3,4,7,8-HXCDD	—	—	—	—	—	—	—
1,2,3,4,7,8-HXCDF	—	—	—	—	—	—	—
1,2,3,6,7,8-HXCDD	—	—	—	—	—	—	—
1,2,3,6,7,8-HXCDF	—	—	—	—	—	—	—
1,2,3,7,8,9-HXCDD	—	—	—	—	—	—	—
1,2,3,7,8,9-HXCDF	—	—	—	—	—	—	—
1,2,3,7,8-PECDD	—	—	—	—	—	—	—
1,2,3,7,8-PECDF	—	—	—	—	—	—	—
2,3,4,6,7,8-HXCDF	—	—	—	—	—	—	—
2,3,4,7,8-PECDF	—	—	—	—	—	—	—
2,3,7,8-TCDD	—	—	—	—	—	—	—
2,3,7,8-TCDF	—	—	—	—	—	—	—
TOTAL HPCDD	—	—	—	—	—	—	—
TOTAL HPCDF	—	—	—	—	—	—	—
TOTAL HXCDD	—	—	—	—	—	—	—
TOTAL HXCDF	—	—	—	—	—	—	—
TOTAL PECDD	—	—	—	—	—	—	—
TOTAL PECDF	—	—	—	—	—	—	—
TOTAL TCDD	—	—	—	—	—	—	—
TOTAL TCDF	—	—	—	—	—	—	—
TEQ	—	—	—	—	—	—	—
TEQ FULLND	—	—	—	—	—	—	—
Inorganics (mg/kg)							
ALUMINUM	9510	17400	9450	4900	12300	6440	16400
ANTIMONY	0.671 U	0.645 U	0.643	1.46 U	1.69 U	0.546 UJ	0.645 UJ
ARSENIC	12	7.34	9.71	6	7.09	8.73 J	9.51 J
BARIUM	61.7 J	140 J	60.9 J	81.2 J	103 J	28.1 J	119 J
BERYLLIUM	0.844	1.46	0.506	1.35	4.05	0.425 J	1.16 J
CADMIUM	0.898	0.653	0.414	0.979	4.15	0.909	0.799
CALCIUM	59000	26600	57800	10500	24200	30100 J	6730 J
CHROMIUM	16	19.3	16.2	10.7	12.1	12.7 J	22.3 J
COBALT	10.3	9.54	9.49	6.8	23.8	7.28	9.89
COPPER	46.5	37.8	66.6	69.9	59.8	24.5 J	40.5 J
IRON	27600 J	25800 J	24900 J	40100 J	32900 J	22900 J	34900 J
LEAD	66.5	29.1	38.4	94.3	41.3	18.3 J	21.4 J
MAGNESIUM	38000	5180	29200	3150	10700	18400	4070
MANGANESE	583	1690	650	203	760	744 J	1200 J
MERCURY	0.047 J	0.0822	0.0742	0.0889	0.484	0.0545	0.0835

APPENDIX F-2

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB08-SO-0204	NTC21SB09-SO-0204	NTC21SB10-SO-0406	NTC21SB11-SO-0204	NTC21SB12-SO-0204	NTC21SB13-SO-0204	NTC21SB14-SO-0204
LOCATION ID	NTC21-SB-08	NTC21-SB-09	NTC21-SB-10	NTC21-SB-11	NTC21-SB-12	NTC21-SB-13	NTC21-SB-14
SAMPLE DATE	20090928	20090926	20090926	20090926	20090926	20090927	20090927
SAMPLE TIME	12:00:00	16:28:00	18:40:00	18:12:00	14:10:00	09:10:00	09:40:00
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	2	2	4	2	2	2	2
BOTTOM DEPTH	4	4	6	4	4	4	4
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB
Inorganics (mg/kg) (Continued)							
NICKEL	28.4	23.2	25.9	19.2	42.7	22.5 J	33 J
POTASSIUM	1110	1780	1570	607	683	953	1430
SELENIUM	1.01 UJ	0.387 U	0.924 U	0.878 U	1.01 U	0.82 U	0.387 UJ
SILVER	0.134 U	0.129 U	0.123 U	0.293 U	0.338 U	0.109 U	0.129 U
SODIUM	210	2920	483	885	601	521	801
THALLIUM	0.537 U	2.26 U	0.493 U	0.878 U	1.01 U	0.437 UJ	1.03 UJ
VANADIUM	20.2 J	28	21.7	15.5	20.5	18.4	28
ZINC	229	156	116	244	358	216 J	130 J
Miscellaneous Parameters (%)							
PERCENT CLAY	11	---	---	---	---	---	---
PERCENT GRAVEL	39	---	---	---	---	---	---
PERCENT SAND	29	---	---	---	---	---	---
PERCENT SILT	21	---	---	---	---	---	---
SIEVE 1"	100	---	---	---	---	---	---
SIEVE 1/2"	81	---	---	---	---	---	---
SIEVE 3/4"	93	---	---	---	---	---	---
SIEVE NO. 004	61	---	---	---	---	---	---
SIEVE NO. 010	51	---	---	---	---	---	---
SIEVE NO. 040	43	---	---	---	---	---	---
SIEVE NO. 100	36	---	---	---	---	---	---
SIEVE NO. 200	32	---	---	---	---	---	---

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB15-SO-0204	NTC21SB16-SO-0204	NTC21SB17-SO-0507	NTC21SB18-SO-0507	NTC21SB19-SO-0204	NTC21SB20-SO-0406	NTC21SB21-SO-0608	NTC21SB22-SO-0204
LOCATION ID	NTC21-SB-15	NTC21-SB-16	NTC21-SB-17	NTC21-SB-18	NTC21-SB-19	NTC21-SB-20	NTC21-SB-21	NTC21-SB-22
SAMPLE DATE	20090927	20090927	20090926	20090926	20090927	20090926	20090926	20090927
SAMPLE TIME	10:10:00	16:50:00	13:32:00	12:59:00	17:50:00	17:02:00	15:20:00	12:10:00
SAMPLE CODE	ORIG	NORMAL	NORMAL	ORIG	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	2	2	5	5	2	4	6	2
BOTTOM DEPTH	4	4	7	7	4	6	8	4
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB	SB
Volatile Organics (ug/kg)								
1,1,1-TRICHLOROETHANE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
1,1,2,2-TETRACHLOROETHANE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
1,1,2-TRICHLOROETHANE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
1,1,2-TRICHLOROTRIFLUOROETHANE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
1,1-DICHLOROETHANE	4.9 UJ	4.9 UJ	3.8 U	4.5 U	5 UJ	4 U	5.1 U	5.5 UJ
1,1-DICHLOROETHENE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
1,2,4-TRICHLOROBENZENE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
1,2-DIBROMO-3-CHLOROPROPANE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
1,2-DIBROMOETHANE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
1,2-DICHLOROBENZENE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
1,2-DICHLOROETHANE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
1,2-DICHLOROPROPANE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
1,3-DICHLOROBENZENE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
1,4-DICHLOROBENZENE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
2-BUTANONE	4.9 U	14	3.8 UJ	4.5 UJ	9.1	4 UJ	5.1 UJ	5.5 U
2-HEXANONE	4.9 U	4.9 U	3.8 UJ	4.5 UJ	5 U	4 U	5.1 U	5.5 U
4-METHYL-2-PENTANONE	4.9 U	4.9 U	3.8 UJ	4.5 UJ	5 U	4 U	5.1 U	5.5 U
ACETONE	25 J	79	3.8 UJ	4.5 UJ	87	4 U	5.1 U	5.5 U
BENZENE	4.9 U	4.9 U	3 J	4.8	5 U	1.2 J	1.6 J	5.5 U
BROMODICHLOROMETHANE	9.9 U	9.8 U	7.6 U	8.9 U	10 U	8 U	10 U	11 U
BROMOFORM	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
BROMOMETHANE	9.9 U	9.8 U	7.6 U	8.9 U	10 U	8 U	10 U	11 U
CARBON DISULFIDE	1.4 J	4.9 U	3.8 U	1.2 J	5 U	12	5.1 U	9
CARBON TETRACHLORIDE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
CHLOROBENZENE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
CHLORODIBROMOMETHANE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
CHLOROETHANE	9.9 U	9.8 U	7.6 U	8.9 U	10 U	8 U	10 U	11 U
CHLOROFORM	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
CHLOROMETHANE	9.9 U	1 J	7.6 U	8.9 U	2.2 J	8 U	10 U	11 U
CIS-1,2-DICHLOROETHENE	9.9 U	9.8 U	7.6 U	8.9 U	10 U	8 U	10 U	11 U
CIS-1,3-DICHLOROPROPENE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
CYCLOHEXANE	4.9 U	4.9 U	4.4	9	5 U	2.5 J	3.2 J	0.75 J
DICHLORODIFLUOROMETHANE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
ETHYLBENZENE	4.9 U	4.9 U	1.9 J	1 J	5 U	4 U	5.1 U	5.5 U
ISOPROPYLBENZENE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
METHYL ACETATE	9.9 U	9.8 U	7.6 U	8.9 U	10 U	8 U	10 U	11 U
METHYL CYCLOHEXANE	4.9 U	4.9 U	8.7	11	5 U	5.4	4.4 J	1.4 J
METHYL TERT-BUTYL ETHER	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
METHYLENE CHLORIDE	1.3 U	1.1 U	1.4 U	1.8 U	1.4 U	0.72 U	1 U	1.4 U
STYRENE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
TETRACHLOROETHENE	4.9 U	4.9 U	3.8 U	4.5 U	18	4 U	5.1 U	5.5 U
TOLUENE	4.9 U	4.9 U	5.6	5.4	5 U	1.4 J	1.4 J	5.5 U
TOTAL XYLENES	4.9 U	4.9 U	2.2 J	4.5 U	5 U	4 U	5.1 U	5.5 U
TRANS-1,2-DICHLOROETHENE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
TRANS-1,3-DICHLOROPROPENE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
TRICHLOROETHENE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
TRICHLOROFLUOROMETHANE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U
VINYL CHLORIDE	4.9 U	4.9 U	3.8 U	4.5 U	5 U	4 U	5.1 U	5.5 U

APPENDIX F-2

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB15-SO-0204	NTC21SB16-SO-0204	NTC21SB17-SO-0507	NTC21SB18-SO-0507	NTC21SB19-SO-0204	NTC21SB20-SO-0406	NTC21SB21-SO-0608	NTC21SB22-SO-0204
LOCATION ID	NTC21-SB-15	NTC21-SB-16	NTC21-SB-17	NTC21-SB-18	NTC21-SB-19	NTC21-SB-20	NTC21-SB-21	NTC21-SB-22
SAMPLE DATE	20090927	20090927	20090926	20090926	20090927	20090926	20090926	20090927
SAMPLE TIME	10:10:00	16:50:00	13:32:00	12:59:00	17:50:00	17:02:00	15:20:00	12:10:00
SAMPLE CODE	ORIG	NORMAL	NORMAL	ORIG	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	2	2	5	5	2	4	6	2
BOTTOM DEPTH	4	4	7	7	4	6	8	4
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB	SB
Semivolatile Organics (ug/kg)								
1,1-BIPHENYL	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
2,2'-OXYBIS(1-CHLOROPROPANE)	860 U	860 U	740 U	750 U	800 U	770 U	740 U	830 U
2,4,5-TRICHLOROPHENOL	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
2,4,6-TRICHLOROPHENOL	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
2,4-DICHLOROPHENOL	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
2,4-DIMETHYLPHENOL	860 U	860 UJ	740 UJ	750 UJ	800 U	770 UJ	740 UJ	830 U
2,4-DINITROPHENOL	4300 U	4300 UJ	3700 U	3700 U	4000 U	3800 U	3700 U	4100 U
2,4-DINITROTOLUENE	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
2,6-DINITROTOLUENE	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
2-CHLORONAPHTHALENE	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
2-CHLOROPHENOL	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
2-METHYLNAPHTHALENE	99	17	3.7 U	3.7 U	33	2.4 J	3.7 U	410
2-METHYLPHENOL	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
2-NITROANILINE	1700 U	1700 UJ	1500 UJ	1500 UJ	1600 U	1500 UJ	1500 UJ	1600 U
2-NITROPHENOL	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
3,3'-DICHLOROBENZIDINE	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
3-NITROANILINE	1700 U	1700 U	1500 U	1500 U	1600 U	1500 U	1500 U	1600 U
4,6-DINITRO-2-METHYLPHENOL	1700 U	1700 UJ	1500 U	1500 U	1600 U	1500 U	1500 U	1600 U
4-BROMOPHENYL PHENYL ETHER	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
4-CHLORO-3-METHYLPHENOL	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
4-CHLOROANILINE	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
4-CHLOROPHENYL PHENYL ETHER	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
4-METHYLPHENOL	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
4-NITROANILINE	1700 U	1700 U	1500 U	1500 U	1600 U	1500 U	1500 U	1600 U
4-NITROPHENOL	1700 U	1700 U	1500 UJ	1500 UJ	1600 U	1500 UJ	1500 UJ	1600 U
ACENAPHTHENE	4.3 U	4.3 U	3.7 U	3.7 U	12	3.8 U	3.7 U	62
ACENAPHTHYLENE	12	4.3 U	3.7 U	3.7 U	4 U	3.8 U	3.7 U	4.1 U
ACETOPHENONE	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
ANTHRACENE	4.3 U	4.3 U	3.7 U	3.7 U	4 U	2.9 J	3.7 U	4.1 U
ATRAZINE	430 U	430 U	370 UJ	370 UJ	400 U	380 UJ	370 UJ	410 U
BENZALDEHYDE	430 UR	430 UR	370 U	370 U	400 UR	380 U	370 U	410 UR
BENZO(A)ANTHRACENE	47 J	16	3.7 U	3.7 U	150	9.4	2.5 J	230
BENZO(A)PYRENE	4.3 UJ	4.3 U	3.7 U	3.7 U	4 U	12	3.7 U	480
BENZO(B)FLUORANTHENE	4.3 UJ	8.7	3.7 U	3.7 U	260	19	3.7 U	400
BENZO(G,H,I)PERYLENE	4.3 UJ	4.3 U	4.1	3.7 U	50	3.8 U	6.2	370
BENZO(K)FLUORANTHENE	4.3 UJ	7.4	3.7 U	3.7 U	250	8.5	3.7 U	350
BIS(2-CHLOROETHOXY)METHANE	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
BIS(2-CHLOROETHYL)ETHER	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
BIS(2-ETHYLHEXYL)PHTHALATE	430 U	430 U	370 U	370 U	54 J	380 U	370 U	110 J
BUTYL BENZYL PHTHALATE	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 UJ
CAPROLACTAM	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
CARBAZOLE	860 U	860 U	740 U	750 U	800 U	770 U	740 U	830 U
CHRYSENE	35	7.2	3.4 J	3.4 J	140	14	8.3	360
DI-N-BUTYL PHTHALATE	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
DI-N-OCTYL PHTHALATE	430 U	430 U	370 U	370 U	400 UJ	380 U	370 U	410 UJ
DIBENZO(A,H)ANTHRACENE	4.3 U	4.3 U	3.7 U	3.7 U	4 U	2.4 J	3.7 U	4.1 U
DIBENZOFURAN	55 J	430 U	370 U	370 U	34 J	380 U	370 U	120 J
DIETHYL PHTHALATE	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
DIMETHYL PHTHALATE	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
FLUORANTHENE	80	12	3.7 U	3.7 U	340	33	6.8	830
FLUORENE	4.3 U	4.3 U	3.7 U	3.7 U	4 U	2.5 J	3.7 U	1 U

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB15-SO-0204	NTC21SB16-SO-0204	NTC21SB17-SO-0507	NTC21SB18-SO-0507	NTC21SB19-SO-0204	NTC21SB20-SO-0406	NTC21SB21-SO-0608	NTC21SB22-SO-0204
LOCATION ID	NTC21-SB-15	NTC21-SB-16	NTC21-SB-17	NTC21-SB-18	NTC21-SB-19	NTC21-SB-20	NTC21-SB-21	NTC21-SB-22
SAMPLE DATE	20090927	20090927	20090926	20090926	20090927	20090926	20090926	20090927
SAMPLE TIME	10:10:00	16:50:00	13:32:00	12:59:00	17:50:00	17:02:00	15:20:00	12:10:00
SAMPLE CODE	ORIG	NORMAL	NORMAL	ORIG	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	2	2	5	5	2	4	6	2
BOTTOM DEPTH	4	4	7	7	4	6	8	4
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB	SB
Semivolatile Organics (ug/kg) (Continued)								
HEXACHLOROBENZENE	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
HEXACHLOROBUTADIENE	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
HEXACHLOROCYCLOPENTADIENE	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
HEXACHLOROETHANE	860 U	860 U	740 U	750 U	800 U	770 U	740 U	830 U
INDENO(1,2,3-CD)PYRENE	4.3 UJ	4.3 U	3.7 U	3.7 U	4 U	12	3.7 U	340
ISOPHORONE	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
N-NITROSO-DI-N-PROPYLAMINE	430 U	430 UJ	370 UJ	370 UJ	400 U	380 UJ	370 UJ	410 U
N-NITROSODIPHENYLAMINE	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
NAPHTHALENE	44	4.3 U	3.7 U	3.7 U	30	3.8 J	3.7 U	4600
NITROBENZENE	430 U	430 UJ	370 UJ	370 UJ	400 U	380 UJ	370 UJ	410 U
PENTACHLOROPHENOL	1700 U	1700 U	1500 U	1500 U	1600 U	1500 U	1500 U	1600 U
PHENANTHRENE	190	2.2 J	1.8 J	2.3 J	310	24	4.2	740
PHENOL	430 U	430 U	370 U	370 U	400 U	380 U	370 U	410 U
PYRENE	70	12	3.7 U	3.7 U	260	26	6.9	700
BAP EQUIVALENT	4.735	2.5512	0.0034	0.0034	43.64	18.539	0.2583	580.86
BAP EQUIVALENT FULLND	14.238	11.5812	8.5504	8.5504	52.04	18.539	8.4353	584.96
TOTAL PAHS	577	82.5	9.3	5.7	1835	171.9	34.9	9872
TOTAL PAHS FULLND	615.7	121.2	61.1	61.2	1859	183.3	75.6	9888.4
Pesticides/PCBS (ug/kg)								
4,4'-DDD	0.87 U	0.87 U	0.75 U	0.75 U	0.81 U	0.77 U	0.75 U	330
4,4'-DDE	0.87 U	0.87 U	0.75 UJ	0.75 UJ	0.81 U	0.77 UJ	0.75 UJ	150
4,4'-DDT	0.87 UJ	0.87 UJ	0.75 UJ	0.75 UJ	0.81 UJ	0.77 UJ	0.75 UJ	62 J
ALDRIN	0.43 U	0.43 U	0.37 UJ	0.37 UJ	0.4 U	0.38 UJ	0.37 UJ	0.41 UJ
ALPHA-BHC	0.43 U	0.43 U	0.37 U	0.37 U	0.31 J	0.38 U	0.37 U	0.27 J
ALPHA-CHLORDANE	0.43 U	0.43 U	0.37 UJ	0.37 UJ	0.4 U	0.38 UJ	0.37 UJ	26 J
AROCLOR-1016	22 U	22 U	19 U	19 U	20.5 U	19.6 U	19 U	21.1 U
AROCLOR-1221	22 U	22 U	19 U	19 U	20.5 U	19.6 U	19 U	21.1 U
AROCLOR-1232	22 U	22 U	19 U	19 U	20.5 U	19.6 U	19 U	21.1 U
AROCLOR-1242	22 U	22 U	19 U	19 U	20.5 U	19.6 U	19 U	21.1 U
AROCLOR-1248	22 U	22 U	19 U	19 U	20.5 U	19.6 U	19 U	21.1 U
AROCLOR-1254	22 U	22 U	19 U	19 U	20.5 U	19.6 U	19 U	21.1 U
AROCLOR-1260	22 U	22 U	19 UJ	19 UJ	20.5 U	19.6 UJ	19 UJ	270 J
BETA-BHC	0.43 U	0.43 U	0.37 UJ	0.37 UJ	0.4 U	0.38 UJ	0.37 UJ	0.41 U
DELTA-BHC	0.43 U	0.43 U	0.37 UJ	0.37 UJ	0.25 J	0.38 UJ	0.37 UJ	0.41 U
DIELDRIN	0.87 U	0.87 U	0.75 UJ	0.75 UJ	0.81 U	0.77 UJ	0.75 UJ	3.2 J
ENDOSULFAN I	0.43 U	0.43 U	0.37 UJ	0.37 UJ	0.29 J	0.38 UJ	0.37 UJ	0.41 UJ
ENDOSULFAN II	0.87 U	0.87 U	0.75 UJ	0.75 UJ	0.81 U	0.77 UJ	0.75 UJ	0.65 J
ENDOSULFAN SULFATE	0.87 U	0.87 U	0.75 UJ	0.75 UJ	0.81 U	0.77 UJ	0.75 UJ	5.8 J
ENDRIN	0.87 UJ	0.87 UJ	0.75 UJ	0.75 UJ	0.81 UJ	0.77 UJ	0.75 UJ	0.83 UJ
ENDRIN ALDEHYDE	0.87 UJ	0.87 UJ	0.75 U	0.75 U	0.81 UJ	0.77 UJ	0.75 UJ	0.83 UJ
ENDRIN KETONE	0.87 U	0.87 U	0.75 UJ	0.75 UJ	0.81 U	0.77 UJ	0.75 UJ	0.83 UJ
GAMMA-BHC (LINDANE)	0.43 U	0.43 U	0.37 U	0.37 U	0.4 U	0.38 U	0.37 U	0.41 U
GAMMA-CHLORDANE	0.43 U	0.43 U	0.37 UJ	0.37 UJ	0.47 J	0.38 UJ	0.37 UJ	46 J
HEPTACHLOR	0.43 U	0.43 U	0.37 UJ	0.37 UJ	0.4 U	0.38 UJ	0.37 UJ	0.41 UJ
HEPTACHLOR EPOXIDE	0.43 U	0.43 U	0.37 UJ	0.37 UJ	0.26 J	0.38 UJ	0.37 UJ	6.9 J
METHOXYCHLOR	0.43 UJ	0.43 UJ	0.37 UJ	0.37 UJ	0.84 J	0.38 UJ	0.37 UJ	0.41 UJ
TOXAPHENE	43 U	43 U	37 U	37 U	40 U	38 U	37 U	41 U
Herbicides (ug/kg)								
2,4,5-T	6.48 U	6.46 U	5.58 U	5.6 U	6.02 U	5.77 U	5.58 U	6.22 U
2,4,5-TP (SILVEX)	6.48 U	6.46 U	5.58 U	5.6 U	6.02 U	5.77 U	5.58 U	6.22 U
2,4-D	64.8 U	64.6 U	55.8 U	56 U	60.2 U	57.7 U	55.8 U	62.2 U

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB15-SO-0204	NTC21SB16-SO-0204	NTC21SB17-SO-0507	NTC21SB18-SO-0507	NTC21SB19-SO-0204	NTC21SB20-SO-0406	NTC21SB21-SO-0608	NTC21SB22-SO-0204
LOCATION ID	NTC21-SB-15	NTC21-SB-16	NTC21-SB-17	NTC21-SB-18	NTC21-SB-19	NTC21-SB-20	NTC21-SB-21	NTC21-SB-22
SAMPLE DATE	20090927	20090927	20090926	20090926	20090927	20090926	20090926	20090927
SAMPLE TIME	10:10:00	16:50:00	13:32:00	12:59:00	17:50:00	17:02:00	15:20:00	12:10:00
SAMPLE CODE	ORIG	NORMAL	NORMAL	ORIG	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	2	2	5	5	2	4	6	2
BOTTOM DEPTH	4	4	7	7	4	6	8	4
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB	SB
Herbicides (ug/kg) (Continued)								
2,4-DB	64.8 U	64.6 U	55.8 U	56 U	60.2 U	57.7 U	55.8 U	62.2 U
DALAPON	162 UJ	161 UJ	140 U	140 U	150 UJ	144 U	139 U	155 UJ
DICAMBA	6.48 U	29.2 J	5.58 U	5.6 U	6.02 U	5.77 U	5.58 U	6.22 U
DICHLOROPROP	64.8 U	64.6 U	55.8 U	56 U	60.2 U	57.7 U	55.8 U	62.2 U
DINOSEB	32.4 U	32.3 U	27.9 UJ	28 UJ	30.1 U	28.9 UJ	27.9 UJ	31.1 U
MCPA	6480 U	6460 U	5580 U	5600 U	6020 U	5770 U	5580 U	6220 U
MCPP	6480 U	6460 U	5580 U	5600 U	6020 U	5770 U	5580 U	6220 U
Dioxins/Furans (ng/kg)								
1,2,3,4,6,7,8,9-OCDD	—	—	—	—	—	—	—	—
1,2,3,4,6,7,8,9-OCDF	—	—	—	—	—	—	—	—
1,2,3,4,6,7,8-HPCDD	—	—	—	—	—	—	—	—
1,2,3,4,6,7,8-HPCDF	—	—	—	—	—	—	—	—
1,2,3,4,7,8,9-HPCDF	—	—	—	—	—	—	—	—
1,2,3,4,7,8-HXCDD	—	—	—	—	—	—	—	—
1,2,3,4,7,8-HXCDF	—	—	—	—	—	—	—	—
1,2,3,6,7,8-HXCDD	—	—	—	—	—	—	—	—
1,2,3,6,7,8-HXCDF	—	—	—	—	—	—	—	—
1,2,3,7,8,9-HXCDD	—	—	—	—	—	—	—	—
1,2,3,7,8,9-HXCDF	—	—	—	—	—	—	—	—
1,2,3,7,8-PECDD	—	—	—	—	—	—	—	—
1,2,3,7,8-PECDF	—	—	—	—	—	—	—	—
2,3,4,6,7,8-HXCDF	—	—	—	—	—	—	—	—
2,3,4,7,8-PECDF	—	—	—	—	—	—	—	—
2,3,7,8-TCDD	—	—	—	—	—	—	—	—
2,3,7,8-TCDF	—	—	—	—	—	—	—	—
TOTAL HPCDD	—	—	—	—	—	—	—	—
TOTAL HPCDF	—	—	—	—	—	—	—	—
TOTAL HXCDD	—	—	—	—	—	—	—	—
TOTAL HXCDF	—	—	—	—	—	—	—	—
TOTAL PECDD	—	—	—	—	—	—	—	—
TOTAL PECDF	—	—	—	—	—	—	—	—
TOTAL TCDD	—	—	—	—	—	—	—	—
TOTAL TCDF	—	—	—	—	—	—	—	—
TEQ	—	—	—	—	—	—	—	—
TEQ FULLND	—	—	—	—	—	—	—	—
Inorganics (mg/kg)								
ALUMINUM	24300	18200	3720	4230	14500	8380	3770	5240
ANTIMONY	0.671 UJ	0.595 U	0.534 U	0.569 U	0.602 UJ	0.577 U	0.581 U	1.64 UJ
ARSENIC	85 J	9.1 J	12.5	8.65 J	9.59 J	8.39	5.7	5.69 J
BARIUM	157 J	99.5 J	23.4 J	18.6 J	105 J	59.5 J	12.4 J	56.2 J
BERYLLIUM	3.77 J	1.27 J	0.244	0.266	0.818 J	0.479	0.225	1.08 J
CADMIUM	9.62	0.569	0.175	0.153	0.3	0.338	0.124	0.809
CALCIUM	63600 J	4530 J	68400	79300	4280 J	55900	72300	26700 J
CHROMIUM	16.7 J	26.8 J	7.9	8.66	24 J	13.5	8.23	13 J
COBALT	22 J	10.6	5.71	7.93	11.3	9.18	4.85	3.38
COPPER	110 J	39.8 J	29.3	22.4	25.3 J	27.3	16	57.2 J
IRON	65800 J	34800 J	29400 J	21100 J	33200 J	21200 J	14300 J	31300 J
LEAD	19.9 J	21 J	19.6	14.6	16.6 J	28.6	8.86	102 J
MAGNESIUM	3860 J	4640	42600	48800	4910	36600	43300	9310
MANGANESE	1230 J	863 J	438	887	1190 J	803	568	263 J
MERCURY	0.0206	0.0711 J	0.0156	[illegible]0151 U	0.0627 J	0.0499	0.0138	[illegible]1 J

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21SB15-SO-0204	NTC21SB16-SO-0204	NTC21SB17-SO-0507	NTC21SB18-SO-0507	NTC21SB19-SO-0204	NTC21SB20-SO-0406	NTC21SB21-SO-0608	NTC21SB22-SO-0204
LOCATION ID	NTC21-SB-15	NTC21-SB-16	NTC21-SB-17	NTC21-SB-18	NTC21-SB-19	NTC21-SB-20	NTC21-SB-21	NTC21-SB-22
SAMPLE DATE	20090927	20090927	20090926	20090926	20090927	20090926	20090926	20090927
SAMPLE TIME	10:10:00	16:50:00	13:32:00	12:59:00	17:50:00	17:02:00	15:20:00	12:10:00
SAMPLE CODE	ORIG	NORMAL	NORMAL	ORIG	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO	SO
TOP DEPTH	2	2	5	5	2	4	6	2
BOTTOM DEPTH	4	4	7	7	4	6	8	4
DEPTH UNIT	FT	FT	FT	FT	FT	FT	FT	FT
SUBMATRIX	SB	SB	SB	SB	SB	SB	SB	SB
Inorganics (mg/kg) (Continued)								
NICKEL	44.4 J	39.2 J	16.6	18.6	31.9 J	21.5	13.9	17.9 J
POTASSIUM	1180	1930	864	936	1660	1010	834	600
SELENIUM	1.31 J	0.357 UJ	0.801 U	1.71 U	0.902 UJ	0.866 U	1.16 U	0.982 UJ
SILVER	0.134 U	0.119 U	0.107 U	0.114 U	0.12 U	0.115 U	0.116 U	0.327 U
SODIUM	1310	3370	984	347	1210	1470	241	1300
THALLIUM	1.07 UJ	0.595 UJ	0.32 U	0.569 U	0.842 UJ	0.577 U	0.349 U	0.982 UJ
VANADIUM	21.4	26.9	11.5	12.9	25	19.5	11.2	15.8
ZINC	263 J	186 J	56.8	68	80.4 J	90.1	49.7	119 J
Miscellaneous Parameters (%)								
PERCENT CLAY	—	—	—	—	—	—	—	—
PERCENT GRAVEL	—	—	—	—	—	—	—	—
PERCENT SAND	—	—	—	—	—	—	—	—
PERCENT SILT	—	—	—	—	—	—	—	—
SIEVE 1"	—	—	—	—	—	—	—	—
SIEVE 1/2"	—	—	—	—	—	—	—	—
SIEVE 3/4"	—	—	—	—	—	—	—	—
SIEVE NO. 004	—	—	—	—	—	—	—	—
SIEVE NO. 010	—	—	—	—	—	—	—	—
SIEVE NO. 040	—	—	—	—	—	—	—	—
SIEVE NO. 100	—	—	—	—	—	—	—	—
SIEVE NO. 200	—	—	—	—	—	—	—	—

F-3 GROUNDWATER ANALYTICAL RESULTS

APPENDIX F-3

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
GREAT LAKES NAVAL STATION
GREAT LAKES, ILLINOIS

MPLE ID	NTC21MW0101	NTC21MW0201	NTC21MW0301	NTC21MW0401	NTC21MW0501	NTC21MW0601
OCATION ID	NTC21MW01	NTC21MW02	NTC21MW03	NTC21MW04	NTC21MW05	NTC21MW06
SAMPLE DATE	20091117	20091116	20091116	20091116	20091115	20091117
SAMPLE TIME	11:45:00	12:46:00	10:05:00	13:10:00	16:26:00	14:05:00
SAMPLE CODE	NORMAL	ORIG	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	GW	GW	GW	GW	GW	GW
Volatile Organics (ug/L)						
1,1,1-TRICHLOROETHANE	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
1,1,2,2-TETRACHLOROETHANE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1,2-TRICHLOROETHANE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1,2-TRICHLOROTRIFLUOROETHANE	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
1,1-DICHLOROETHANE	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
1,1-DICHLOROETHENE	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1,2,4-TRICHLOROBENZENE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2-DIBROMO-3-CHLOROPROPANE	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
1,2-DIBROMOETHANE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2-DICHLOROBENZENE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2-DICHLOROETHANE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2-DICHLOROPROPANE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,3-DICHLOROBENZENE	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
1,4-DICHLOROBENZENE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-BUTANONE	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
2-HEXANONE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
4-METHYL-2-PENTANONE	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ
ACETONE	3.6 J	4.6 J	0.84 UJ	2.2 J	3.4 J	1.8 J
BENZENE	0.96 J	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
BROMODICHLOROMETHANE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
BROMOFORM	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
BROMOMETHANE	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
CARBON DISULFIDE	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
CARBON TETRACHLORIDE	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
CHLOROBENZENE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLORODIBROMOMETHANE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
CHLOROETHANE	0.18 U	0.18 UJ	0.18 UJ	0.18 UJ	0.18 UJ	0.18 U
CHLOROFORM	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
CHLOROMETHANE	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ
S-1,2-DICHLOROETHENE	0.13 U	0.13 U	0.13 U	0.13 U	0.79 J	0.13 U
S-1,3-DICHLOROPROPENE	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
CYCLOHEXANE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
DICHLORODIFLUOROMETHANE	0.22 U	0.22 UJ	0.22 UJ	0.22 UJ	0.22 UJ	0.22 U
ETHYLBENZENE	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
ISOPROPYLBENZENE	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
METHYL ACETATE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
METHYL CYCLOHEXANE	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
METHYL TERT-BUTYL ETHER	1.6	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
METHYLENE CHLORIDE	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
STYRENE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
TETRACHLOROETHENE	0.85 J	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
TOLUENE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
TOTAL XYLENES	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
TRANS-1,2-DICHLOROETHENE	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
TRANS-1,3-DICHLOROPROPENE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
TRICHLOROETHENE	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
TRICHLOROFLUOROMETHANE	2.5	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
VINYL CHLORIDE	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
Semivolatile Organics (ug/L)						
1,1-BIPHENYL	0.38 U	0.36 U	0.38 U	0.38 U	0.36 U	0.38 U
2,2'-OXYBIS(1-CHLOROPROPANE)	0.83 UJ	0.79 U	0.82 U	0.83 U	0.79 UJ	0.83 UJ
2,4,5-TRICHLOROPHENOL	0.49 U	0.46 U	0.48 U	0.49 U	0.46 U	0.49 U
2,4,6-TRICHLOROPHENOL	0.72 U	0.68 U	0.7 U	0.72 U	0.68 U	0.72 U
2,4-DICHLOROPHENOL	0.43 U	0.41 U	0.42 U	0.43 U	0.41 U	0.43 U
2,4-DIMETHYLPHENOL	0.7 U	0.66 U	0.68 U	0.7 U	0.66 U	0.7 U
2,4-DINITROPHENOL	0.83 UJ	0.79 U	0.82 U	0.83 U	0.79 U	0.83 UJ
2,4-DINITROTOLUENE	0.48 U	0.45 U	0.47 U	0.48 U	0.45 U	0.48 U
2,6-DINITROTOLUENE	0.65 U	0.61 U	0.63 U	0.65 U	0.61 U	0.65 U
2-CHLORONAPHTHALENE	0.57 U	0.54 U	0.56 U	0.57 U	0.54 U	0.57 U
2-CHLOROPHENOL	0.58 U	0.55 U	0.57 U	0.58 U	0.55 U	0.58 U
2-METHYLNAPHTHALENE	0.03 U	0.01 U	0.01 U	0.02 U	0.02 U	0.02 U
2-METHYLPHENOL	0.81 U	0.77 U	0.8 U	0.81 U	0.77 U	0.81 U
2-NITROANILINE	1.2 U	1.1 U	1.1 U	1.2 U	1.1 U	1.2 U
2-NITROPHENOL	0.72 U	0.68 U	0.71 U	0.72 U	0.68 U	0.72 U
3,3'-DICHLOROBENZIDINE	0.87 UJ	0.82 UJ	0.86 UJ	0.87 UJ	0.82 UJ	0.87 UJ
3-NITROANILINE	1 U	0.97 U	1 U	1 U	0.97 U	1 U
5-DINITRO-2-METHYLPHENOL	0.72 U	0.68 U	0.71 U	0.72 U	0.68 U	0.72 U
BROMOPHENYL PHENYL ETHER	0.56 U	0.53 U	0.55 U	0.56 U	0.53 U	0.56 U
4-CHLORO-3-METHYLPHENOL	0.57 U	0.54 U	0.56 U	0.57 U	0.54 U	0.57 U
4-CHLOROANILINE	0.93 U	0.88 U	0.91 U	0.93 U	0.88 U	0.93 U
4-CHLOROPHENYL PHENYL ETHER	0.87 U	0.82 U	0.86 U	0.87 U	0.82 U	0.87 U
4-METHYLPHENOL	0.75 UJ	0.71 U	0.74 U	0.75 U	0.71 U	0.75 UJ

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
GREAT LAKES NAVAL STATION
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21MW0101	NTC21MW0201	NTC21MW0301	NTC21MW0401	NTC21MW0501	NTC21MW060
LOCATION ID	NTC21MW01	NTC21MW02	NTC21MW03	NTC21MW04	NTC21MW05	NTC21MW06
SAMPLE DATE	20091117	20091116	20091116	20091116	20091115	20091117
SAMPLE TIME	11:45:00	12:46:00	10:05:00	13:10:00	16:26:00	14:05:00
SAMPLE CODE	NORMAL	ORIG	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	GW	GW	GW	GW	GW	GW
Semivolatile Organics (ug/L)						
4-NITROANILINE	2 U	1.9 U	2 U	2 U	1.9 U	2 U
4-NITROPHENOL	0.81 UJ	0.77 UJ	0.8 UJ	0.81 UJ	0.77 UJ	0.81 UJ
ACENAPHTHENE	0.1 U	0.01 U	0.02 J	0.02 U	0.02 J	0.02 U
ACENAPHTHYLENE	0.02 U	0.01 U	0.01 U	0.02 U	0.01 U	0.02 U
ACETOPHENONE	0.74 UJ	0.69 UJ	0.72 UJ	0.74 UJ	0.69 UJ	0.74 UJ
ANTHRACENE	0.02 U	0.01 U	0.04 J	0.02 U	0.03 J	0.03 U
ATRAZINE	0.68 U	0.64 UJ	0.66 UJ	0.68 UJ	0.64 UJ	0.68 U
BENZALDEHYDE	0.56 UJ	0.53 U	0.55 U	0.56 U	0.53 U	0.56 UJ
BENZO(A)ANTHRACENE	0.02 U	0.01 U	0.05 J	0.02 U	0.04 J	0.05 U
BENZO(A)PYRENE	0.02 U	0.01 U	0.03 J	0.02 U	0.03 J	0.03 U
BENZO(B)FLUORANTHENE	0.02 U	0.01 U	0.03 J	0.02 U	0.03 J	0.04 U
BENZO(G,H,I)PERYLENE	0.02 U	0.01 U	0.01 U	0.02 U	0.01 U	0.02 U
BENZO(K)FLUORANTHENE	0.02 U	0.01 U	0.03 J	0.02 U	0.03 J	0.04 U
BIS(2-CHLOROETHOXY)METHANE	0.51 U	0.48 U	0.5 U	0.51 U	0.48 U	0.51 U
BIS(2-CHLOROETHYL)ETHER	0.44 U	0.42 U	0.43 U	0.44 U	0.42 U	0.44 U
BIS(2-ETHYLHEXYL)PHTHALATE	1.2 U	1.2 U	1.8 J	1.2 U	1.2 U	1.2 U
BUTYL BENZYL PHTHALATE	0.8 U	0.76 U	0.79 U	0.8 U	0.76 U	0.8 U
CAPROLACTAM	1.2 U	0.51 U	0.47 U	0.46 U	0.8 U	1.2 U
CARBAZOLE	0.68 U	0.64 U	0.66 U	0.68 U	0.64 U	0.68 U
CHRYSENE	0.02 U	0.01 U	0.05 J	0.02 U	0.04 J	0.06 U
DI-N-BUTYL PHTHALATE	1.3 U	1.2 U	1.2 U	1.3 U	1.2 U	1.3 U
DI-N-OCTYL PHTHALATE	0.32 U	0.3 U	0.32 U	0.32 U	0.3 U	0.32 U
DIBENZO(A,H)ANTHRACENE	0.02 U	0.01 U	0.01 U	0.02 U	0.01 U	0.02 U
DIBENZOFURAN	0.64 U	0.6 U	0.62 U	0.64 U	0.6 U	0.64 U
DIETHYL PHTHALATE	1 U	0.94 U	0.98 U	1 U	0.94 U	1 U
DIMETHYL PHTHALATE	0.72 U	0.68 U	0.71 U	0.72 U	0.68 U	0.72 U
FLUORANTHENE	0.13 U	0.01 U	0.04 J	0.03 J	0.06	0.05 U
FLUORENE	0.04 U	0.01 U	0.03 J	0.02 U	0.02 J	0.02 U
HEXACHLOROBENZENE	0.46 U	0.44 U	0.45 U	0.46 U	0.44 U	0.46 U
HEXACHLOROBUTADIENE	0.91 U	0.86 U	0.89 U	0.91 U	0.86 U	0.91 U
HEXACHLOROCYCLOPENTADIENE	0.87 U	0.82 U	0.86 U	0.87 U	0.82 U	0.87 U
HEXACHLOROETHANE	0.45 U	0.42 U	0.44 U	0.45 U	0.42 U	0.45 U
INDENO(1,2,3-CD)PYRENE	0.02 U	0.01 U	0.01 U	0.02 U	0.01 U	0.02 U
ISOPHORONE	0.54 U	0.51 U	0.53 U	0.54 U	0.51 U	0.54 U
N-NITROSO-DI-N-PROPYLAMINE	0.88 UJ	0.83 U	0.86 U	0.88 U	0.83 UJ	0.88 UJ
N-NITROSODIPHENYLAMINE	0.45 U	0.42 U	0.44 U	0.45 U	0.42 U	0.45 U
NAPHTHALENE	0.11 U	0.01 U	0.01 U	0.02 U	0.03 U	0.02 U
NITROBENZENE	0.61 U	0.57 U	0.6 U	0.61 U	0.57 U	0.61 U
PENTACHLOROPHENOL	7.8 J	0.92 U	0.96 U	0.98 U	0.92 U	0.98 U
PHENANTHRENE	0.16 U	0.02 U	0.04 U	0.02 U	0.05 U	0.04 U
PHENOL	0.45 U	0.42 U	0.44 U	0.45 U	0.42 U	0.45 U
PYRENE	0.12 U	0.01 U	0.05 J	0.03 J	0.05	0.06 U
BAP EQUIVALENT	0 U	0 U	0.03835	0 U	0.03734	0 U
BAP EQUIVALENT FULLND	0.04622	0.02311	0.04935	0.04622	0.04834	0.06146
TOTAL PAHS	0	0	0.37	0.06	0.35	0
TOTAL PAHS FULLND	0.89	0.18	0.47	0.36	0.49	0.56
Pesticides/PCBs (ug/L)						
4,4'-DDD	0.0049 UJ	0.00481 UJ	0.0049 UJ	0.0049 UJ	0.00463 UJ	0.0049 UJ
4,4'-DDE	0.0049 UJ	0.00481 UJ	0.0049 UJ	0.0049 UJ	0.00463 UJ	0.0049 UJ
4,4'-DDT	0.0049 UJ	0.00481 UJ	0.0049 UJ	0.0049 UJ	0.00463 UJ	0.0049 UJ
ALDRIN	0.00324 U	0.00317 U	0.00324 U	0.00324 U	0.00306 U	0.00324 U
ALPHA-BHC	0.00324 U	0.00317 U	0.00324 U	0.00324 U	0.00306 U	0.00324 U
ALPHA-CHLORDANE	0.00324 U	0.00317 U	0.00324 U	0.00324 U	0.00385 J	0.00324 U
AROCLOR-1016	0.11 UJ	0.11 U	0.11 U	0.11 U	0.11 U	0.11 UJ
AROCLOR-1221	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
AROCLOR-1232	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
AROCLOR-1242	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
AROCLOR-1248	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
AROCLOR-1254	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
AROCLOR-1260	0.11 UJ	0.11 U	0.11 U	0.11 U	0.11 U	0.11 UJ
BETA-BHC	0.00324 U	0.00317 U	0.00324 U	0.00324 U	0.00306 U	0.00324 U
DELTA-BHC	0.00324 U	0.00317 U	0.00324 U	0.00324 U	0.00801 J	0.02
DIELDRIN	0.0049 U	0.00481 U	0.0049 U	0.0049 U	0.00463 U	0.0049 U
ENDOSULFAN I	0.00324 U	0.00317 UJ	0.00324 UJ	0.00324 UJ	0.00306 UJ	0.00324 U
ENDOSULFAN II	0.0049 U	0.00481 U	0.0049 U	0.0049 U	0.00463 U	0.0049 U
ENDOSULFAN SULFATE	0.0049 U	0.00481 U	0.0049 U	0.0049 U	0.00463 U	0.0049 U
ENDRIN	0.0049 UJ	0.00481 U	0.0049 U	0.0049 U	0.00463 U	0.0049 UJ
ENDRIN ALDEHYDE	0.0049 UJ	0.00481 UJ	0.0049 UJ	0.0049 UJ	0.00463 UJ	0.0049 UJ
ENDRIN KETONE	0.0049 U	0.00481 U	0.0049 U	0.0049 U	0.00463 U	0.0049 U
GAMMA-BHC (LINDANE)	0.00324 U	0.00317 U	0.00324 U	0.00324 U	0.00306 U	0.00324 U
GAMMA-CHLORDANE	0.00324 U	0.00317 U	0.00324 U	0.00324 U	0.00311 J	0.00324 U
HEPTACHLOR	0.00324 U	0.00317 U	0.00324 U	0.00324 U	0.00306 U	0.00324 U

APPENDIX F-3

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
GREAT LAKES NAVAL STATION
GREAT LAKES, ILLINOIS

MPLE ID	NTC21MW0101	NTC21MW0201	NTC21MW0301	NTC21MW0401	NTC21MW0501	NTC21MW0601
OCATION ID	NTC21MW01	NTC21MW02	NTC21MW03	NTC21MW04	NTC21MW05	NTC21MW06
SAMPLE DATE	20091117	20091116	20091116	20091116	20091115	20091117
SAMPLE TIME	11:45:00	12:46:00	10:05:00	13:10:00	16:26:00	14:05:00
SAMPLE CODE	NORMAL	ORIG	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	GW	GW	GW	GW	GW	GW
Pesticides/PCBs (ug/L) (Continued)						
HEPTACHLOR EPOXIDE	0.00324 U	0.00317 U	0.00324 U	0.00324 U	0.00306 U	0.00324 U
METHOXYCHLOR	0.00324 UJ	0.00317 UJ	0.00324 UJ	0.00324 UJ	0.00306 UJ	0.00324 UJ
TOXAPHENE	0.32 U	0.31 U	0.32 U	0.32 U	0.3 U	0.32 U
Herbicides (ug/L)						
2,4,5-T	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
2,4,5-TP (SILVEX)	0.03 J	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
2,4-D	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
2,4-DB	0.62 J	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
DALAPON	0.75 J	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U
DICAMBA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
DICHLOROPROP	0.24 U	0.5 J	0.34 J	0.24 U	0.78 J	0.24 U
DINOSEB	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
MCPA	24 U	24.5 U	24.5 U	24.5 U	24.5 U	24.5 U
MCPP	24 U	24.5 U	24.5 U	24.5 U	24.5 U	24.5 U
Dioxins/Furans (pg/L)						
1,2,3,4,6,7,8,9-OCDD	—	—	—	—	10.7 U	—
1,2,3,4,6,7,8,9-OCDF	—	—	—	—	10.7 U	—
1,2,3,4,6,7,8-HPCDD	—	—	—	—	5.34 U	—
1,2,3,4,6,7,8-HPCDF	—	—	—	—	5.34 U	—
1,2,3,4,7,8,9-HPCDF	—	—	—	—	5.34 U	—
1,2,3,4,7,8-HXCDD	—	—	—	—	5.34 U	—
1,2,3,4,7,8-HXCDF	—	—	—	—	5.34 U	—
1,2,3,6,7,8-HXCDD	—	—	—	—	5.34 U	—
1,2,3,6,7,8-HXCDF	—	—	—	—	5.34 U	—
1,2,3,7,8,9-HXCDD	—	—	—	—	5.34 U	—
1,2,3,7,8,9-HXCDF	—	—	—	—	5.34 U	—
1,2,3,7,8-PECDD	—	—	—	—	5.34 U	—
1,2,3,7,8-PECDF	—	—	—	—	5.34 U	—
2,3,4,6,7,8-HXCDF	—	—	—	—	5.34 U	—
4,7,8-PECDF	—	—	—	—	5.34 U	—
7,8-TCDD	—	—	—	—	1.23 U	—
3,7,8-TCDF	—	—	—	—	1.07 U	—
TOTAL HPCDD	—	—	—	—	5.34 U	—
TOTAL HPCDF	—	—	—	—	5.34 U	—
TOTAL HXCDD	—	—	—	—	5.34 U	—
TOTAL HXCDF	—	—	—	—	5.34 U	—
TOTAL PECDD	—	—	—	—	5.34 U	—
TOTAL PECDF	—	—	—	—	5.34 U	—
TOTAL TCDD	—	—	—	—	1.23 U	—
TOTAL TCDF	—	—	—	—	1.07 U	—
TEQ	—	—	—	—	0 U	—
TEQ FULLND	—	—	—	—	12.34382	—
Inorganics (ug/L)						
ALUMINUM	252	668 J	303	122	145	25 U
ANTIMONY	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U
ARSENIC	1.88 J	7.26 J	0.88 J	1.6	2.39	0.75 U
BARIUM	123	34.5	33.1	32.3	422	118
BERYLLIUM	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
CADMIUM	0.79	0.86	1.34	0.69	3.45	0.92
CALCIUM	96600	671000	504000	121000	374000	142000
CHROMIUM	4.13	0.75 U	0.5 U	0.5 U	2.5 U	0.5 U
COBALT	1.25 U	15.3	3.55	1.25 U	4.65	1.25 U
COPPER	4.25 J	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U
IRON	22.3	34000	2610	752	173	38.3
LEAD	1.88 U	9.38 UJ	3.75 U	0.75 U	1.88 U	0.83
MAGNESIUM	608	97600	20500	54000	125000	49400
MANGANESE	0.89	3040	2150	168	5400	61.3
MERCURY	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
NICKEL	0.75	11.3	0.89	1.52	1.84	0.75 U
POTASSIUM	40200 J	13100 J	11100 J	3440	11600	2980
SELENIUM	1.63	6.25 U	7.5 U	1 U	6.25 U	0.75 U
SILVER	0.25 U	0.47 J	0.25 U	0.25 U	1.3	0.25 U
SODIUM	698000	772000	667000	55700	1040000	331000
THALLIUM	0.75 U	2 U	1.5 U	0.75 U	3.75 U	0.75 U
VANADIUM	4.36	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U
ZINC	1.25 U	31.2 U	12.5 U	1.5	6.25 U	2.83
tered Inorganics (ug/L)						
UMINUM	—	—	—	12.5 U	—	—
ANTIMONY	—	—	—	1.25 U	—	—
ARSENIC	—	—	—	1.16	—	—
BARIUM	—	—	—	32.4	—	—
BERYLLIUM	—	—	—	0.25 U	—	—

APPENDIX F-3

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
SITE 21 - BUILDINGS 1517/1506 AREA
GREAT LAKES NAVAL STATION
GREAT LAKES, ILLINOIS

SAMPLE ID	NTC21MW0101	NTC21MW0201	NTC21MW0301	NTC21MW0401	NTC21MW0501	NTC21MW060
LOCATION ID	NTC21MW01	NTC21MW02	NTC21MW03	NTC21MW04	NTC21MW05	NTC21MW06
SAMPLE DATE	20091117	20091116	20091116	20091116	20091115	20091117
SAMPLE TIME	11:45:00	12:46:00	10:05:00	13:10:00	16:26:00	14:05:00
SAMPLE CODE	NORMAL	ORIG	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	GW	GW	GW	GW	GW	GW
Filtered Inorganics (ug/L) (Continued)						
CADMIUM	—	—	—	0.68	—	—
CALCIUM	—	—	—	122000	—	—
CHROMIUM	—	—	—	0.5 U	—	—
COBALT	—	—	—	1.25 U	—	—
COPPER	—	—	—	1.25 U	—	—
IRON	—	—	—	478	—	—
LEAD	—	—	—	1.88 U	—	—
MAGNESIUM	—	—	—	54200	—	—
MANGANESE	—	—	—	161	—	—
MERCURY	—	—	—	0.08 U	—	—
NICKEL	—	—	—	1.7	—	—
POTASSIUM	—	—	—	3360	—	—
SELENIUM	—	—	—	0.75 U	—	—
SILVER	—	—	—	0.25 U	—	—
SODIUM	—	—	—	57100	—	—
THALLIUM	—	—	—	0.75 U	—	—
VANADIUM	—	—	—	1.25 U	—	—
ZINC	—	—	—	1.32	—	—

F-4 QA/QC AND IDW ANALYTICAL RESULTS

SUMMARY OF QA/QC AND IDW ANALYTICAL RESULTS
SITE 21 - BUILDING 1517 LANDFILL
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

TYPE	QC		QC		QC		QC		QC		QC		QC		QC		QC	
SAMPLE	TB-092609-01		TB-092709-01		TB-092809-01		064_RB-092909-01		RB-092909-02		SB-092909-01		TB-092909-01		FB-111709-01		NTC01-TB111809-01	
MATRIX	QC		QC		QC		QC		QC		QC		QC		QC		QC	
SAMPLE DATE	20090926		20090927		20090928		20090929		20090929		20090929		20090929		20091117		20091118	
Volatile Organics																		
1,1,1-TRICHLOROETHANE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.17 U	UG/L	1 U	UG/L
1,1,2,2-TETRACHLOROETHANE	1 U	UG/L	1 UJ	UG/L	1 UJ	UG/L	1 UJ	UG/L	1 UJ	UG/L	1 UJ	UG/L	1 U	UG/L	0.1 U	UG/L	1 U	UG/L
1,1,2-TRICHLOROETHANE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.1 U	UG/L	1 U	UG/L
1,1,2-TRICHLOROTRIFLUOROETHANE	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	0.18 U	UG/L	2 U	UG/L
1,1-DICHLOROETHANE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.12 U	UG/L	1 U	UG/L
1,1-DICHLOROETHENE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.15 U	UG/L	1 U	UG/L
1,2,4-TRICHLOROBENZENE	0.31 J	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.2 J	UG/L	0.12 U	UG/L	1 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.11 U	UG/L	1 U	UG/L
1,2-DIBROMOETHANE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.1 U	UG/L	1 U	UG/L
1,2-DICHLOROBENZENE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.1 U	UG/L	1 U	UG/L
1,2-DICHLOROETHANE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.1 U	UG/L	1 U	UG/L
1,2-DICHLOROPROPANE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.1 U	UG/L	1 U	UG/L
1,3-DICHLOROBENZENE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.13 U	UG/L	1 U	UG/L
1,4-DICHLOROBENZENE	0.13 J	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.1 U	UG/L	1 U	UG/L
2-BUTANONE	10 U	UG/L	10 U	UG/L	10 UJ	UG/L	10 UJ	UG/L	10 UJ	UG/L	10 UJ	UG/L	10 U	UG/L	1 UJ	UG/L	10 UJ	UG/L
2-HEXANONE	5 U	UG/L	5 UJ	UG/L	5 UJ	UG/L	5 UJ	UG/L	5 UJ	UG/L	5 UJ	UG/L	5 U	UG/L	0.3 U	UG/L	5 U	UG/L
4-METHYL-2-PENTANONE	5 U	UG/L	5 U	UG/L	5 U	UG/L	5 U	UG/L	5 U	UG/L	5 U	UG/L	5 U	UG/L	0.29 UJ	UG/L	5 UJ	UG/L
ACETONE	10 U	UG/L	10 UJ	UG/L	10 UJ	UG/L	5.3 J	UG/L	10 UJ	UG/L	4.8 J	UG/L	10 U	UG/L	0.84 UJ	UG/L	5.6 J	UG/L
BENZENE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.11 U	UG/L	1 U	UG/L
BROMODICHLOROMETHANE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.1 U	UG/L	1 U	UG/L
BROMOFORM	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.1 U	UG/L	1 U	UG/L
BROMOMETHANE	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	0.32 U	UG/L	2 U	UG/L
CARBON DISULFIDE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.13 U	UG/L	1 U	UG/L
CARBON TETRACHLORIDE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.15 U	UG/L	1 U	UG/L
CHLOROBENZENE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.1 U	UG/L	1 U	UG/L
CHLORODIBROMOMETHANE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.1 U	UG/L	1 U	UG/L
CHLOROETHANE	2 U	UG/L	2 UJ	UG/L	2 UJ	UG/L	2 UJ	UG/L	2 UJ	UG/L	2 UJ	UG/L	2 U	UG/L	0.18 U	UG/L	2 U	UG/L
CHLOROFORM	0.12 J	UG/L	0.13 J	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.11 U	UG/L	1 U	UG/L
CHLOROMETHANE	2 U	UG/L	2 U	UG/L	2 U	UG/L	1.6 J	UG/L	0.72 J	UG/L	0.61 J	UG/L	2 U	UG/L	0.29 UJ	UG/L	0.45 J	UG/L
CIS-1,2-DICHLOROETHENE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.13 U	UG/L	1 U	UG/L
CIS-1,3-DICHLOROPROPENE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.11 U	UG/L	1 U	UG/L
CYCLOHEXANE	1 U	UG/L	1 UJ	UG/L	1 UJ	UG/L	1 UJ	UG/L	1 UJ	UG/L	1 UJ	UG/L	1 U	UG/L	0.2 U	UG/L	1 U	UG/L
DICHLORODIFLUOROMETHANE	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	0.22 U	UG/L	2 UJ	UG/L
ETHYLBENZENE	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.17 J	UG/L	1 U	UG/L	0.2 J	UG/L	1 U	UG/L	0.13 U	UG/L	1 U	UG/L
ISOPROPYLBENZENE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.15 U	UG/L	1 U	UG/L
METHYL ACETATE	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	0.3 U	UG/L	2 U	UG/L
METHYL CYCLOHEXANE	0.21 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.17 U	UG/L	1 U	UG/L
METHYL TERT-BUTYL ETHER	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.1 U	UG/L	1 U	UG/L
METHYLENE CHLORIDE	0.4 U	UG/L	0.24 U	UG/L	0.46 U	UG/L	2.4 U	UG/L	1.8 U	UG/L	2.4 U	UG/L	0.29 U	UG/L	0.14 U	UG/L	0.75 J	UG/L
STYRENE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.1 U	UG/L	1 U	UG/L
TETRACHLOROETHENE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.15 U	UG/L	1 U	UG/L
TOLUENE	1 U	UG/L	1 U	UG/L	1 U	UG/L	2.1 J	UG/L	13 J	UG/L	2.1 J	UG/L	1 U	UG/L	0.1 U	UG/L	1 U	UG/L
TOTAL XYLENES	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.66 J	UG/L	0.53 J	UG/L	0.65 J	UG/L	1 U	UG/L	0.22 U	UG/L	1 U	UG/L
TRANS-1,2-DICHLOROETHENE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.13 U	UG/L	1 U	UG/L
TRANS-1,3-DICHLOROPROPENE	1 U	UG/L	1 UJ	UG/L	1 UJ	UG/L	1 UJ	UG/L	1 UJ	UG/L	1 UJ	UG/L	1 U	UG/L	0.1 U	UG/L	1 U	UG/L
TRICHLOROETHENE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.13 U	UG/L	1 U	UG/L
TRICHLOROFLUOROMETHANE	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	2 U	UG/L	0.17 U	UG/L	2 U	UG/L
VINYL CHLORIDE	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	1 U	UG/L	0.18 U	UG/L	1 U	UG/L

APPENDIX F-4

SUMMARY OF QA/QC AND IDW ANALYTICAL RESULTS
SITE 21 - BUILDING 1517 LANDFILL
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

TYPE	QC	QC	QC	QC		QC		QC		QC	QC	QC
SAMPLE	TB-092609-01	TB-092709-01	TB-092809-01	064_RB-092909-01		RB-092909-02		SB-092909-01		TB-092909-01	FB-111709-01	NTC01-TB111809-01
MATRIX	QC	QC	QC	QC		QC		QC		QC	QC	QC
SAMPLE DATE	20090926	20090927	20090928	20090929		20090929		20090929		20090929	20091117	20091118
Semivolatile Organics												
1,1-BIPHENYL	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
2,2'-OXYBIS(1-CHLOROPROPANE)	—	—	—	4.8 UJ	UG/L	4.7 UJ	UG/L	4.6 UJ	UG/L	—	—	—
2,4,5-TRICHLOROPHENOL	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
2,4,6-TRICHLOROPHENOL	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
2,4-DICHLOROPHENOL	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
2,4-DIMETHYLPHENOL	—	—	—	19 UJ	UG/L	19 UJ	UG/L	18 UJ	UG/L	—	—	—
2,4-DINITROPHENOL	—	—	—	48 U	UG/L	47 U	UG/L	46 U	UG/L	—	—	—
2,4-DINITROTOLUENE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
2,6-DINITROTOLUENE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
2-CHLORONAPHTHALENE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
2-CHLOROPHENOL	—	—	—	4.8 UJ	UG/L	4.7 UJ	UG/L	4.6 UJ	UG/L	—	—	—
2-METHYLNAPHTHALENE	—	—	—	0.068 U	UG/L	0.07 U	UG/L	0.046 U	UG/L	—	—	—
2-METHYLPHENOL	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
2-NITROANILINE	—	—	—	19 UJ	UG/L	19 UJ	UG/L	18 UJ	UG/L	—	—	—
2-NITROPHENOL	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
3,3'-DICHLOROBENZIDINE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
3-NITROANILINE	—	—	—	19 U	UG/L	19 U	UG/L	18 U	UG/L	—	—	—
4,6-DINITRO-2-METHYLPHENOL	—	—	—	19 U	UG/L	19 U	UG/L	18 U	UG/L	—	—	—
4-BROMOPHENYL PHENYL ETHER	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
4-CHLORO-3-METHYLPHENOL	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
4-CHLOROANILINE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
4-CHLOROPHENYL PHENYL ETHER	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
4-METHYLPHENOL	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
4-NITROANILINE	—	—	—	19 U	UG/L	19 U	UG/L	18 U	UG/L	—	—	—
4-NITROPHENOL	—	—	—	19 UJ	UG/L	19 UJ	UG/L	18 UJ	UG/L	—	—	—
ACENAPHTHENE	—	—	—	0.048 U	UG/L	0.056 U	UG/L	0.046 U	UG/L	—	—	—
ACENAPHTHYLENE	—	—	—	0.048 U	UG/L	0.049 U	UG/L	0.046 U	UG/L	—	—	—
ACETOPHENONE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
ANTHRACENE	—	—	—	0.048 U	UG/L	0.07	UG/L	0.046 U	UG/L	—	—	—
ATRAZINE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
BENZALDEHYDE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
BENZO(A)ANTHRACENE	—	—	—	0.048 UJ	UG/L	0.034 J	UG/L	0.046 UJ	UG/L	—	—	—
BENZO(A)PYRENE	—	—	—	0.048 U	UG/L	0.028 J	UG/L	0.046 U	UG/L	—	—	—
BENZO(B)FLUORANTHENE	—	—	—	0.048 U	UG/L	0.04 J	UG/L	0.046 U	UG/L	—	—	—
BENZO(G,H,I)PERYLENE	—	—	—	0.048 U	UG/L	0.047 U	UG/L	0.046 U	UG/L	—	—	—
BENZO(K)FLUORANTHENE	—	—	—	0.048 UJ	UG/L	0.066 UJ	UG/L	0.046 UJ	UG/L	—	—	—
BIS(2-CHLOROETHOXY)METHANE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
BIS(2-CHLOROETHYL)ETHER	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
BIS(2-ETHYLHEXYL)PHTHALATE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
BUTYL BENZYL PHTHALATE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
CAPROLACTAM	—	—	—	4.8 UJ	UG/L	4.7 UJ	UG/L	0.6 J	UG/L	—	—	—
CARBAZOLE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
CHRYSENE	—	—	—	0.048 U	UG/L	0.058	UG/L	0.046 U	UG/L	—	—	—
DI-N-BUTYL PHTHALATE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
DI-N-OCTYL PHTHALATE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
DIBENZO(A,H)ANTHRACENE	—	—	—	0.048 U	UG/L	0.036 J	UG/L	0.046 U	UG/L	—	—	—
DIBENZOFURAN	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
DIETHYL PHTHALATE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
DIMETHYL PHTHALATE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—

APPENDIX F-4

SUMMARY OF QA/QC AND IDW ANALYTICAL RESULTS
SITE 21 - BUILDING 1517 LANDFILL
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

TYPE	QC	QC	QC	QC		QC		QC		QC	QC	QC
SAMPLE	TB-092609-01	TB-092709-01	TB-092809-01	064_RB-092909-01		RB-092909-02		SB-092909-01		TB-092909-01	FB-111709-01	NTC01-TB111809-01
MATRIX	QC	QC	QC	QC		QC		QC		QC	QC	QC
SAMPLE DATE	20090926	20090927	20090928	20090929		20090929		20090929		20090929	20091117	20091118
Semivolatile Organics (Continued)												
FLUORANTHENE	—	—	—	0.048 U	UG/L	0.058	UG/L	0.046 U	UG/L	—	—	—
FLUORENE	—	—	—	0.048 U	UG/L	0.063	UG/L	0.046 U	UG/L	—	—	—
HEXACHLOROBENZENE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
HEXACHLOROBUTADIENE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
HEXACHLOROCYCLOPENTADIENE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
HEXACHLOROETHANE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
INDENO(1,2,3-CD)PYRENE	—	—	—	0.048 U	UG/L	0.047 U	UG/L	0.046 UJ	UG/L	—	—	—
ISOPHORONE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
N-NITROSO-DI-N-PROPYLAMINE	—	—	—	4.8 UJ	UG/L	4.7 UJ	UG/L	4.6 UJ	UG/L	—	—	—
N-NITROSODIPHENYLAMINE	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
NAPHTHALENE	—	—	—	0.055 U	UG/L	0.069 U	UG/L	0.046 U	UG/L	—	—	—
NITROBENZENE	—	—	—	4.8 UJ	UG/L	4.7 UJ	UG/L	4.6 UJ	UG/L	—	—	—
PENTACHLOROPHENOL	—	—	—	19 U	UG/L	19 U	UG/L	18 U	UG/L	—	—	—
PHENANTHRENE	—	—	—	0.048 U	UG/L	0.076 U	UG/L	0.046 U	UG/L	—	—	—
PHENOL	—	—	—	4.8 U	UG/L	4.7 U	UG/L	4.6 U	UG/L	—	—	—
PYRENE	—	—	—	0.048 U	UG/L	0.056	UG/L	0.046 U	UG/L	—	—	—
Pesticides/PCBs												
4,4'-DDD	—	—	—	0.02 U	UG/L	0.019 U	UG/L	0.019 U	UG/L	—	—	—
4,4'-DDE	—	—	—	0.02 U	UG/L	0.019 U	UG/L	0.019 U	UG/L	—	—	—
4,4'-DDT	—	—	—	0.02 U	UG/L	0.019 U	UG/L	0.019 U	UG/L	—	—	—
ALDRIN	—	—	—	0.01 U	UG/L	0.009 U	UG/L	0.01 U	UG/L	—	—	—
ALPHA-BHC	—	—	—	0.01 U	UG/L	0.009 U	UG/L	0.01 U	UG/L	—	—	—
ALPHA-CHLORDANE	—	—	—	0.01 U	UG/L	0.009 U	UG/L	0.01 U	UG/L	—	—	—
AROCLOR-1016	—	—	—	0.49 UJ	UG/L	0.472 UJ	UG/L	0.481 UJ	UG/L	—	—	—
AROCLOR-1221	—	—	—	0.49 U	UG/L	0.472 U	UG/L	0.481 U	UG/L	—	—	—
AROCLOR-1232	—	—	—	0.49 U	UG/L	0.472 U	UG/L	0.481 U	UG/L	—	—	—
AROCLOR-1242	—	—	—	0.49 U	UG/L	0.472 U	UG/L	0.481 U	UG/L	—	—	—
AROCLOR-1248	—	—	—	0.49 U	UG/L	0.472 U	UG/L	0.481 U	UG/L	—	—	—
AROCLOR-1254	—	—	—	0.49 U	UG/L	0.472 U	UG/L	0.481 U	UG/L	—	—	—
AROCLOR-1260	—	—	—	0.49 U	UG/L	0.472 U	UG/L	0.481 U	UG/L	—	—	—
BETA-BHC	—	—	—	0.01 U	UG/L	0.009 U	UG/L	0.01 U	UG/L	—	—	—
DELTA-BHC	—	—	—	0.01 U	UG/L	0.009 U	UG/L	0.01 U	UG/L	—	—	—
DIELDRIN	—	—	—	0.02 U	UG/L	0.019 U	UG/L	0.019 U	UG/L	—	—	—
ENDOSULFAN I	—	—	—	0.01 U	UG/L	0.009 U	UG/L	0.01 U	UG/L	—	—	—
ENDOSULFAN II	—	—	—	0.02 U	UG/L	0.019 U	UG/L	0.019 U	UG/L	—	—	—
ENDOSULFAN SULFATE	—	—	—	0.02 U	UG/L	0.019 U	UG/L	0.019 U	UG/L	—	—	—
ENDRIN	—	—	—	0.02 U	UG/L	0.019 U	UG/L	0.019 U	UG/L	—	—	—
ENDRIN ALDEHYDE	—	—	—	0.02 U	UG/L	0.019 U	UG/L	0.019 U	UG/L	—	—	—
ENDRIN KETONE	—	—	—	0.02 U	UG/L	0.019 U	UG/L	0.019 U	UG/L	—	—	—
GAMMA-BHC (LINDANE)	—	—	—	0.01 U	UG/L	0.009 U	UG/L	0.01 U	UG/L	—	—	—
GAMMA-CHLORDANE	—	—	—	0.01	UG/L	0.01 J	UG/L	0.006 J	UG/L	—	—	—
HEPTACHLOR	—	—	—	0.01 U	UG/L	0.009 U	UG/L	0.01 U	UG/L	—	—	—
HEPTACHLOR EPOXIDE	—	—	—	0.01 U	UG/L	0.009 U	UG/L	0.01 U	UG/L	—	—	—
METHOXYCHLOR	—	—	—	0.01 U	UG/L	0.009 U	UG/L	0.01 U	UG/L	—	—	—
TOXAPHENE	—	—	—	0.98 U	UG/L	0.943 U	UG/L	0.962 U	UG/L	—	—	—
Dioxins/Furans												
1,2,3,4,6,7,8,9-OCDD	—	—	—	9.29 J	PG/L	—		101 U	PG/L	—	—	—
1,2,3,4,6,7,8,9-OCDF	—	—	—	103 U	PG/L	—		101 U	PG/L	—	—	—
1,2,3,4,6,7,8-HPCDD	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—

APPENDIX F-4

SUMMARY OF QA/QC AND IDW ANALYTICAL RESULTS
SITE 21 - BUILDING 1517 LANDFILL
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

TYPE	QC	QC	QC	QC		QC		QC		QC	QC	QC
SAMPLE	TB-092609-01	TB-092709-01	TB-092809-01	064_RB-092909-01		RB-092909-02		SB-092909-01		TB-092909-01	FB-111709-01	NTC01-TB111809-01
MATRIX	QC	QC	QC	QC		QC		QC		QC	QC	QC
SAMPLE DATE	20090926	20090927	20090928	20090929		20090929		20090929		20090929	20091117	20091118
Dioxins/Furans (Continued)												
1,2,3,4,6,7,8-HPCDF	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
1,2,3,4,7,8,9-HPCDF	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
1,2,3,4,7,8-HXCDD	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
1,2,3,4,7,8-HXCDF	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
1,2,3,6,7,8-HXCDD	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
1,2,3,6,7,8-HXCDF	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
1,2,3,7,8,9-HXCDD	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
1,2,3,7,8,9-HXCDF	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
1,2,3,7,8-PECDD	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
1,2,3,7,8-PECDF	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
2,3,4,6,7,8-HXCDF	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
2,3,4,7,8-PECDF	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
2,3,7,8-TCDD	—	—	—	10.3 U	PG/L	—		10.1 U	PG/L	—	—	—
2,3,7,8-TCDF	—	—	—	10.3 U	PG/L	—		10.1 U	PG/L	—	—	—
TOTAL HPCDD	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
TOTAL HPCDF	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
TOTAL HXCDD	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
TOTAL HXCDF	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
TOTAL PECDD	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
TOTAL PECDF	—	—	—	51.5 U	PG/L	—		50.5 U	PG/L	—	—	—
TOTAL TCDD	—	—	—	10.3 U	PG/L	—		10.1 U	PG/L	—	—	—
TOTAL TCDF	—	—	—	10.3 U	PG/L	—		10.1 U	PG/L	—	—	—
Herbicides												
2,4,5-T	—	—	—	0.05 UJ	UG/L	0.05 UJ	UG/L	0.05 UJ	UG/L	—	—	—
2,4,5-TP (SILVEX)	—	—	—	0.05 U	UG/L	0.05 U	UG/L	0.05 U	UG/L	—	—	—
2,4-D	—	—	—	0.5 UJ	UG/L	0.5 UJ	UG/L	0.5 UJ	UG/L	—	—	—
2,4-DB	—	—	—	0.5 U	UG/L	0.5 U	UG/L	0.5 U	UG/L	—	—	—
DALAPON	—	—	—	1.2 U	UG/L	1.2 U	UG/L	1.2 U	UG/L	—	—	—
DICAMBA	—	—	—	0.05 U	UG/L	0.05 U	UG/L	0.05 U	UG/L	—	—	—
DICHLOROPROP	—	—	—	0.5 U	UG/L	0.5 U	UG/L	0.5 U	UG/L	—	—	—
DINOSEB	—	—	—	0.25 UJ	UG/L	0.25 UJ	UG/L	0.25 UJ	UG/L	—	—	—
MCPA	—	—	—	50 U	UG/L	50 U	UG/L	50 U	UG/L	—	—	—
MCPP	—	—	—	50 U	UG/L	50 U	UG/L	50 U	UG/L	—	—	—
Inorganics												
ALUMINUM	—	—	—	731	UG/L	12.5 U	UG/L	12.5 U	UG/L	—	—	—
ANTIMONY	—	—	—	1.25 U	UG/L	1.25 U	UG/L	1.25 U	UG/L	—	—	—
ARSENIC	—	—	—	0.75 U	UG/L	0.75 U	UG/L	0.75 U	UG/L	—	—	—
BARIUM	—	—	—	3.73	UG/L	1.25 U	UG/L	1.25 U	UG/L	—	—	—
BERYLLIUM	—	—	—	0.25 U	UG/L	0.25 U	UG/L	0.25 U	UG/L	—	—	—
CADMIUM	—	—	—	0.25 U	UG/L	0.25 U	UG/L	0.25 U	UG/L	—	—	—
CALCIUM	—	—	—	5100	UG/L	250 U	UG/L	250 U	UG/L	—	—	—
CHROMIUM	—	—	—	9.77	UG/L	0.5 U	UG/L	0.5 U	UG/L	—	—	—
COBALT	—	—	—	1.25 U	UG/L	1.25 U	UG/L	1.25 U	UG/L	—	—	—
COPPER	—	—	—	2.18	UG/L	1.25 U	UG/L	1.25 U	UG/L	—	—	—
IRON	—	—	—	1980	UG/L	7.5 U	UG/L	7.5 U	UG/L	—	—	—
LEAD	—	—	—	0.375 U	UG/L	0.375 U	UG/L	0.375 U	UG/L	—	—	—
MAGNESIUM	—	—	—	2610	UG/L	250 U	UG/L	250 U	UG/L	—	—	—
MANGANESE	—	—	—	46.4	UG/L	0.75 U	UG/L	0.75 U	UG/L	—	—	—
MERCURY	—	—	—	0.08 U	UG/L	0.08 U	UG/L	0.08 U	UG/L	—	—	—

APPENDIX F-4

SUMMARY OF QA/QC AND IDW ANALYTICAL RESULTS
SITE 21 - BUILDING 1517 LANDFILL
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

TYPE	QC	QC	QC	QC		QC		QC		QC	QC	QC
SAMPLE	**TB-092609-01**	**TB-092709-01**	**TB-092809-01**	**064_RB-092909-01**		**RB-092909-02**		**SB-092909-01**		**TB-092909-01**	**FB-111709-01**	**NTC01-TB111809-01**
MATRIX	QC	QC	QC	QC		QC		QC		QC	QC	QC
SAMPLE DATE	20090926	20090927	20090928	20090929		20090929		20090929		20090929	20091117	20091118
Inorganics (Continued)												
NICKEL	—	—	—	5.35	UG/L	0.75 U	UG/L	0.75 U	UG/L	—	—	—
POTASSIUM	—	—	—	388	UG/L	250 U	UG/L	250 U	UG/L	—	—	—
SELENIUM	—	—	—	0.75 U	UG/L	0.75 U	UG/L	0.75 U	UG/L	—	—	—
SILVER	—	—	—	0.25 U	UG/L	0.25 U	UG/L	0.25 U	UG/L	—	—	—
SODIUM	—	—	—	250 U	UG/L	250 U	UG/L	250 U	UG/L	—	—	—
THALLIUM	—	—	—	0.75 U	UG/L	0.75 U	UG/L	0.75 U	UG/L	—	—	—
VANADIUM	—	—	—	1.93	UG/L	1.25 U	UG/L	1.25 U	UG/L	—	—	—
ZINC	—	—	—	7.5	UG/L	1.25 U	UG/L	1.25 U	UG/L	—	—	—

APPENDIX F-4

SUMMARY OF QA/QC AND IDW ANALYTICAL RESULTS
SITE 21 - BUILDING 1517 LANDFILL
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

TYPE	IDW	IDW	IDW		IDW	
SAMPLE	IDW-AQ-092909-01	IDW-SO-092909-01	IDW-111709		NTC01-COMPOSITE	
MATRIX	WW	WS	WW		WS	
SAMPLE DATE	20090929	20090929	20091117		20091118	
Volatile Organics						
1,1,1-TRICHLOROETHANE	—	—	—		4.6 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	—	—	—		4.6 U	UG/KG
1,1,2-TRICHLOROETHANE	—	—	—		4.6 U	UG/KG
1,1,2-TRICHLOROTRIFLUOROETHANE	—	—	—		4.6 U	UG/KG
1,1-DICHLOROETHANE	—	—	—		4.6 U	UG/KG
1,1-DICHLOROETHENE	—	—	1 U	UG/L	4.6 U	UG/KG
1,2,4-TRICHLOROBENZENE	—	—	—		4.6 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	—	—	—		4.6 U	UG/KG
1,2-DIBROMOETHANE	—	—	—		4.6 U	UG/KG
1,2-DICHLOROBENZENE	—	—	—		4.6 U	UG/KG
1,2-DICHLOROETHANE	—	—	1 U	UG/L	4.6 U	UG/KG
1,2-DICHLOROPROPANE	—	—	—		4.6 U	UG/KG
1,3-DICHLOROBENZENE	—	—	—		4.6 U	UG/KG
1,4-DICHLOROBENZENE	—	—	—		4.6 U	UG/KG
2-BUTANONE	—	—	10 U	UG/L	12 J	UG/KG
2-HEXANONE	—	—	—		4.6 U	UG/KG
4-METHYL-2-PENTANONE	—	—	—		4.6 U	UG/KG
ACETONE	—	—	—		4.6 U	UG/KG
BENZENE	—	—	0.14 J	UG/L	0.74 J	UG/KG
BROMODICHLOROMETHANE	—	—	—		9.3 U	UG/KG
BROMOFORM	—	—	—		4.6 U	UG/KG
BROMOMETHANE	—	—	—		9.3 U	UG/KG
CARBON DISULFIDE	—	—	—		4.6 U	UG/KG
CARBON TETRACHLORIDE	—	—	1 U	UG/L	4.6 U	UG/KG
CHLOROBENZENE	—	—	1 U	UG/L	4.6 U	UG/KG
CHLORODIBROMOMETHANE	—	—	—		4.6 U	UG/KG
CHLOROETHANE	—	—	—		9.3 U	UG/KG
CHLOROFORM	—	—	1 U	UG/L	4.6 U	UG/KG
CHLOROMETHANE	—	—	—		9.3 U	UG/KG
CIS-1,2-DICHLOROETHENE	—	—	—		9.3 U	UG/KG
CIS-1,3-DICHLOROPROPENE	—	—	—		4.6 U	UG/KG
CYCLOHEXANE	—	—	—		1.4 J	UG/KG
DICHLORODIFLUOROMETHANE	—	—	—		4.6 U	UG/KG
ETHYLBENZENE	—	—	—		4.6 U	UG/KG
ISOPROPYLBENZENE	—	—	—		4.6 U	UG/KG
METHYL ACETATE	—	—	—		9.3 UJ	UG/KG
METHYL CYCLOHEXANE	—	—	—		2.1 J	UG/KG
METHYL TERT-BUTYL ETHER	—	—	—		4.6 U	UG/KG
METHYLENE CHLORIDE	—	—	—		0.62 U	UG/KG
STYRENE	—	—	—		4.6 U	UG/KG
TETRACHLOROETHENE	—	—	1 U	UG/L	4.6 U	UG/KG
TOLUENE	—	—	—		4.6 U	UG/KG
TOTAL XYLENES	—	—	—		4.6 U	UG/KG
TRANS-1,2-DICHLOROETHENE	—	—	—		4.6 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	—	—	—		4.6 U	UG/KG
TRICHLOROETHENE	—	—	1 U	UG/L	4.6 U	UG/KG
TRICHLOROFLUOROMETHANE	—	—	—		4.6 U	UG/KG
VINYL CHLORIDE	—	—	2 U	UG/L	4.6 U	UG/KG

APPENDIX F-4

SUMMARY OF QA/QC AND IDW ANALYTICAL RESULTS
SITE 21 - BUILDING 1517 LANDFILL
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

TYPE	IDW	IDW	IDW	IDW	
SAMPLE	IDW-AQ-092909-01	IDW-SO-092909-01	IDW-111709	NTC01-COMPOSITE	
MATRIX	WW	WS	WW	WS	
SAMPLE DATE	20090929	20090929	20091117	20091118	
Semivolatile Organics					
1,1-BIPHENYL	—	—	—	400 U	UG/KG
2,2'-OXYBIS(1-CHLOROPROPANE)	—	—	—	800 U	UG/KG
2,4,5-TRICHLOROPHENOL	—	—	—	400 U	UG/KG
2,4,6-TRICHLOROPHENOL	—	—	—	400 U	UG/KG
2,4-DICHLOROPHENOL	—	—	—	400 U	UG/KG
2,4-DIMETHYLPHENOL	—	—	—	800 U	UG/KG
2,4-DINITROPHENOL	—	—	—	4000 U	UG/KG
2,4-DINITROTOLUENE	—	—	—	400 U	UG/KG
2,6-DINITROTOLUENE	—	—	—	400 U	UG/KG
2-CHLORONAPHTHALENE	—	—	—	400 U	UG/KG
2-CHLOROPHENOL	—	—	—	400 U	UG/KG
2-METHYLNAPHTHALENE	—	—	—	56	UG/KG
2-METHYLPHENOL	—	—	—	400 U	UG/KG
2-NITROANILINE	—	—	—	1600 U	UG/KG
2-NITROPHENOL	—	—	—	400 U	UG/KG
3,3'-DICHLOROBENZIDINE	—	—	—	400 UJ	UG/KG
3-NITROANILINE	—	—	—	1600 U	UG/KG
4,6-DINITRO-2-METHYLPHENOL	—	—	—	1600 U	UG/KG
4-BROMOPHENYL PHENYL ETHER	—	—	—	400 U	UG/KG
4-CHLORO-3-METHYLPHENOL	—	—	—	400 U	UG/KG
4-CHLOROANILINE	—	—	—	400 U	UG/KG
4-CHLOROPHENYL PHENYL ETHER	—	—	—	400 U	UG/KG
4-METHYLPHENOL	—	—	—	400 U	UG/KG
4-NITROANILINE	—	—	—	1600 UJ	UG/KG
4-NITROPHENOL	—	—	—	1600 U	UG/KG
ACENAPHTHENE	—	—	—	4.8 U	UG/KG
ACENAPHTHYLENE	—	—	—	4.8 U	UG/KG
ACETOPHENONE	—	—	—	400 U	UG/KG
ANTHRACENE	—	—	—	4.8 U	UG/KG
ATRAZINE	—	—	—	400 U	UG/KG
BENZALDEHYDE	—	—	—	400 U	UG/KG
BENZO(A)ANTHRACENE	—	—	—	4.8 U	UG/KG
BENZO(A)PYRENE	—	—	—	4.8 U	UG/KG
BENZO(B)FLUORANTHENE	—	—	—	4.8 U	UG/KG
BENZO(G,H,I)PERYLENE	—	—	—	26	UG/KG
BENZO(K)FLUORANTHENE	—	—	—	4.8 U	UG/KG
BIS(2-CHLOROETHOXY)METHANE	—	—	—	400 U	UG/KG
BIS(2-CHLOROETHYL)ETHER	—	—	—	400 U	UG/KG

APPENDIX F-4

SUMMARY OF QA/QC AND IDW ANALYTICAL RESULTS
SITE 21 - BUILDING 1517 LANDFILL
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

TYPE	IDW		IDW		IDW		IDW	
SAMPLE	IDW-AQ-092909-01		IDW-SO-092909-01		IDW-111709		NTC01-COMPOSITE	
MATRIX	WW		WS		WW		WS	
SAMPLE DATE	20090929		20090929		20091117		20091118	
Semivolatile Organics (Continued)								
BIS(2-ETHYLHEXYL)PHTHALATE	—		—		—		400 U	UG/KG
BUTYL BENZYL PHTHALATE	—		—		—		400 U	UG/KG
CAPROLACTAM	—		—		—		400 U	UG/KG
CARBAZOLE	—		—		—		800 U	UG/KG
CHRYSENE	—		—		—		4.8 U	UG/KG
DI-N-BUTYL PHTHALATE	—		—		—		400 U	UG/KG
DI-N-OCTYL PHTHALATE	—		—		—		400 U	UG/KG
DIBENZO(A,H)ANTHRACENE	—		—		—		4.8 U	UG/KG
DIBENZOFURAN	—		—		—		400 U	UG/KG
DIETHYL PHTHALATE	—		—		—		400 U	UG/KG
DIMETHYL PHTHALATE	—		—		—		400 U	UG/KG
FLUORANTHENE	—		—		—		4.8 U	UG/KG
FLUORENE	—		—		—		4.8 U	UG/KG
HEXACHLOROBENZENE	—		—		—		400 U	UG/KG
HEXACHLOROBUTADIENE	—		—		—		400 U	UG/KG
HEXACHLOROCYCLOPENTADIENE	—		—		—		400 U	UG/KG
HEXACHLOROETHANE	—		—		—		800 U	UG/KG
INDENO(1,2,3-CD)PYRENE	—		—		—		4.8 U	UG/KG
ISOPHORONE	—		—		—		400 U	UG/KG
N-NITROSO-DI-N-PROPYLAMINE	—		—		—		400 U	UG/KG
N-NITROSODIPHENYLAMINE	—		—		—		400 U	UG/KG
NAPHTHALENE	—		—		—		16	UG/KG
NITROBENZENE	—		—		—		400 U	UG/KG
PENTACHLOROPHENOL	—		—		—		1600 U	UG/KG
PHENANTHRENE	—		—		—		53	UG/KG
PHENOL	—		—		—		400 U	UG/KG
PYRENE	—		—		—		20	UG/KG
Pesticides/PCBs								
AROCLOR-1016	—		—		0.47 U	UG/L	—	
AROCLOR-1221	—		—		0.47 U	UG/L	—	
AROCLOR-1232	—		—		0.47 U	UG/L	—	
AROCLOR-1242	—		—		0.47 U	UG/L	—	
AROCLOR-1248	—		—		0.47 U	UG/L	—	
AROCLOR-1254	—		—		0.47 U	UG/L	—	
AROCLOR-1260	—		—		0.47 U	UG/L	—	
TCLP Volatiles								
1,1-DICHLOROETHENE	0.01 UD	MG/L	0.01 UD	MG/L	—		—	
1,2-DICHLOROETHANE	0.01 UD	MG/L	0.01 UD	MG/L	—		—	
2-BUTANONE	0.1 UD	MG/L	0.1 UD	MG/L	—		—	
BENZENE	0.01 UD	MG/L	0.01 UD	MG/L	—		—	
CARBON TETRACHLORIDE	0.01 UD	MG/L	0.01 UD	MG/L	—		—	
CHLOROBENZENE	0.01 UD	MG/L	0.01 UD	MG/L	—		—	
CHLOROFORM	0.0037 JD	MG/L	0.01 UD	MG/L	—		—	
TETRACHLOROETHENE	0.01 UD	MG/L	0.01 UD	MG/L	—		—	
TRICHLOROETHENE	0.01 UD	MG/L	0.01 UD	MG/L	—		—	
VINYL CHLORIDE	0.02 UD	MG/L	0.02 UD	MG/L	—		—	

APPENDIX F-4

SUMMARY OF QA/QC AND IDW ANALYTICAL RESULTS
SITE 21 - BUILDING 1517 LANDFILL
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS
PAGE 9 OF 10

TYPE SAMPLE MATRIX SAMPLE DATE	IDW IDW-AQ-092909-01 WW 20090929		IDW IDW-SO-092909-01 WS 20090929		IDW IDW-111709 WW 20091117		IDW NTC01-COMPOSITE WS 20091118	
TCLP Semivolatiles								
1,4-DICHLOROBENZENE	0.05 U	MG/L	0.05 U	MG/L	0.05 U	MG/L	—	
2,4,5-TRICHLOROPHENOL	0.05 U	MG/L	0.05 U	MG/L	0.05 U	MG/L	—	
2,4,6-TRICHLOROPHENOL	0.05 U	MG/L	0.05 U	MG/L	0.05 U	MG/L	—	
2,4-DINITROTOLUENE	0.05 U	MG/L	0.05 U	MG/L	0.05 U	MG/L	—	
2-METHYLPHENOL	0.05 U	MG/L	0.05 U	MG/L	0.05 U	MG/L	—	
3-METHYLPHENOL	0.05 U	MG/L	0.05 U	MG/L	0.05 U	MG/L	—	
4-METHYLPHENOL	0.05 U	MG/L	0.05 U	MG/L	0.05 U	MG/L	—	
HEXACHLOROBENZENE	0.05 U	MG/L	0.05 U	MG/L	0.05 U	MG/L	—	
HEXACHLOROBUTADIENE	0.05 U	MG/L	0.05 U	MG/L	0.05 U	MG/L	—	
HEXACHLOROETHANE	0.05 U	MG/L	0.05 U	MG/L	0.05 U	MG/L	—	
NITROBENZENE	0.05 U	MG/L	0.05 U	MG/L	0.05 UY	MG/L	—	
PENTACHLOROPHENOL	0.2 U	MG/L	0.2 U	MG/L	0.2 U	MG/L	—	
PYRIDINE	0.2 U	MG/L	0.2 U	MG/L	0.2 U	MG/L	—	
TCLP Pesticides								
CHLORDANE	0.0005 U	MG/L	0.0005 U	MG/L	—		—	
ENDRIN	0.0001 U	MG/L	0.0001 U	MG/L	0.02 UY	MG/L	—	
GAMMA-BHC (LINDANE)	0.0001 U	MG/L	0.0001 U	MG/L	0.4 U	MG/L	—	
HEPTACHLOR	0.0001 U	MG/L	0.0001 U	MG/L	0.008 U	MG/L	—	
HEPTACHLOR EPOXIDE	0.0001 U	MG/L	0.0001 U	MG/L	0.008 U	MG/L	—	
METHOXYCHLOR	0.0001 U	MG/L	0.0001 U	MG/L	10 U	MG/L	—	
TOXAPHENE	0.01 U	MG/L	0.01 U	MG/L	0.5 U	MG/L	—	
TCLP Metals								
ARSENIC	0.03 U	MG/L	0.03 U	MG/L	0.1 U	MG/L	—	
BARIUM	0.05 U	MG/L	0.629	MG/L	0.11 J	MG/L	—	
CADMIUM	0.0159 J	MG/L	0.0199 J	MG/L	0.01 J	MG/L	—	
CHROMIUM	0.02 U	MG/L	0.02 U	MG/L	0.1 U	MG/L	—	
LEAD	0.0274 J	MG/L	0.015 U	MG/L	0.03 U	MG/L	—	
MERCURY	0.000809 J	MG/L	0.0008 U	MG/L	0.002 U	MG/L	—	
SELENIUM	0.03 U	MG/L	0.03 U	MG/L	0.05 U	MG/L	—	
SILVER	0.01 U	MG/L	0.01 U	MG/L	0.1 U	MG/L	—	
TCLP Herbicides								
2,4,5-TP (SILVEX)	0.0005 U	MG/L	0.0005 U	MG/L	1 U	MG/L	—	
2,4-D	0.005 U	MG/L	0.005 U	MG/L	10 U	MG/L	—	
Inorganics								
ALUMINUM	—		—		—		11100	MG/KG
ANTIMONY	—		—		—		0.859 U	MG/KG
ARSENIC	—		—		—		8.34	MG/KG
BARIUM	—		—		—		68.9	MG/KG
BERYLLIUM	—		—		—		0.617	MG/KG
CADMIUM	—		—		—		0.573 U	MG/KG
CALCIUM	—		—		—		72500	MG/KG
CHROMIUM	—		—		—		17.8 J	MG/KG
COBALT	—		—		—		12.9	MG/KG
COPPER	—		—		—		25	MG/KG
IRON	—		—		—		20900	MG/KG
LEAD	—		—		—		12.7	MG/KG
MAGNESIUM	—		—		—		34500	MG/KG
MANGANESE	—		—		—		462	MG/KG
MERCURY	—		—		—		0.0741	MG/KG

APPENDIX F-4

SUMMARY OF QA/QC AND IDW ANALYTICAL RESULTS
SITE 21 - BUILDING 1517 LANDFILL
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

TYPE	IDW		IDW		IDW		IDW	
SAMPLE	**IDW-AQ-092909-01**		**IDW-SO-092909-01**		**IDW-111709**		**NTC01-COMPOSITE**	
MATRIX	WW		WS		WW		WS	
SAMPLE DATE	20090929		20090929		20091117		20091118	
Inorganics (Continued)								
NICKEL	—		—		—		30.4	MG/KG
POTASSIUM	—		—		—		2980	MG/KG
SELENIUM	—		—		—		0.286 U	MG/KG
SILVER	—		—		—		0.286 U	MG/KG
SODIUM	—		—		—		207	MG/KG
THALLIUM	—		—		—		0.458 U	MG/KG
VANADIUM	—		—		—		20.3	MG/KG
ZINC	—		—		—		55	MG/KG
Miscellaneous Parameters								
CORROSIVITY	8.98	S.U.	7.86	S.U.	—		—	
CYANIDE	0.005 U	MG/L	0.144 UN	MG/KG	0.01 U	MG/L	—	
FREE LIQUID	1	S.U.	—		—		—	
IGNITABILITY	158	F	158	F	158 X	F	—	
ODOR	100	S.U.	—		8	UNITLESS	—	
PAINT FILTER	—		—		1 X	UNITLESS	—	
PH	—		—		7.43	S.U.	—	
PHENOLS	0.225	MG/L	0.239 J	MG/KG	0.06 U	MG/L	—	
REACTIVE SULFIDE	50 U	MG/L	50 U	MG/KG	150 U	MG/L	—	
SPECIFIC GRAVITY	0.997	G/ML			1.01	G/ML	—	